

DALPAHAR IRON & MANGANESE ORE MINE

IN DIST. - KEONJHAR, ORISSA.



MODIFICATION TO THE APPROVED MINING PLAN

(FINAL COPY)

अनुमोदित
APPROVED



for & on behalf of
Sri avin Jain
Legal heir to
Late DHARAMCHAND JAIN
Mining Lessee

पत्र संख्या द्वारा
VIDE LETTER No.

MPM/OTF-MECH/21-ORI/BHV/2010-11

11-10-2010

MINING LEASE AREA-	101.171 Ha.
DATE OF EXPIRY -	08.06.2006
CATEGORY OF MINE -	Group - A (OTFM)
TYPE OF LAND -	Forest Area.
SUBMITTED UNDER -	Rule 10 OF M.C.D.R. 1988

PREPARED BY :
Dr. GURPINDER SINGH JAISWAL
Consultant (Mines & minerals)
Government Recognised.
REGN. No. RQP/ CAL/ 151/ 90/ A.

DR GURPINDER SINGH JAISWAL
REGN. NO. RQP/CAL/151/90/A

MODIFICATION TO THE APPROVED MINING PLAN OF
DALPAHAR IRON & MANGANESE MINE OVER 101.171 Ha
IN KEONJHAR DIST., ORISSA.



SUBMITTED
TO
THE REGIONAL CONTROLLER OF MINES
INDIAN BUREAU OF MINES
MAHANI COMPLEX (2nd FLOOR)
308, DISTRICT CENTRE
CHANDRASHEKHARPUR
BHUBANESWAR - 751016

G. S. Jaiswal
(Dr. G. S. Jaiswal)
RQP/CAL/151/90/A.

CONSENT LETTER FROM APPLICANT



The Modification to the approved mining plan and Progressive Mine Closure Plan in respect of Dalpahar Iron & Manganese Ore Mine, for an area of 101.271 hectares, Dist: Keonjhar, State: Orissa, Mineral: Iron & Manganese, has been prepared by Dr. Gurbinder Singh Jaiswal, Registration No. RQP/CAL/151/90/A.

I request Regional Controller of Mines, Bhubaneswar to make further correspondence regarding modification of the approved scheme of mining with the said recognized person on his following address:

Dr. GURPINDER SINGH JAISWAL

B/4, Aastha Cottage

Air Base Colony

P.O. - Kadma - 831005

JAMSHEDPUR

I hereby undertake that all the information so made in the modification to the approved mining plan by the recognized person be deemed to have been made with my knowledge and consent and shall be acceptable to me and binding on me in all respect.

Signature of the
applicant in full:

Name in full in
block letters : AVIN JAIN,
: Legal heir to Late Dharamchand Jain.

Address : DHARAM VILLA
12-A, Mahatma Gandhi Marg (Ring Road)
Lajpat Nagar, IV, New Delhi - 110 024

Phone No : 625003 / 3002 (O), 6437519 / 4921 (R)
: Fax: 6259576, Cable - DHARAM
E-mail - avinjain@yahoo.com

Place : New Delhi
Date :

(Dr. G. S. Jaiswal)

RQP/CAL/151/90/A

DR GURPINDER SINGH JAISWAL
REGN. NO. RQP/CAL/151/90/A

MODIFICATION TO THE APPROVED MINING PLAN OF
DALPAHAR IRON & MANGANESE MINE OVER 101.271 Ha
IN KEONJHAR DIST., ORISSA.



DECLARATION

The above report has been prepared on my / our consent and approval and that I / we will abide by all the commitments made there under. In case of default, the approval of Modification to the approved mining plan would be withdrawn.

Signature of the applicant

Avin Jain
(Avin Jain)

Date :

Place : New Delhi

Dr. G. S. Jaiswal
(Dr. G. S. Jaiswal)
RQP/CAL/151/90/A.



CERTIFICATE

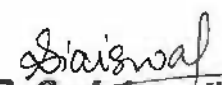
"The Provisions of Mines Act, Rules And Regulations Made Thereunder have been observed in the modification to the approved Mining Plan of Dalpahar Iron & Manganese mine belonging to Sri Avin Jain, Legal heir of Late D. C. Jain and where specific Permissions are required, the Applicant will approach the D.G.M.S. Further, standards prescribed by DGMS in respect of miners. Health will be strictly implemented".

Signature of the applicant


(Avin Jain)

Date :

Place : New Delhi


(Dr. G. S. Jaiswal)
RQP /CAL /151 /90 /A.

DR GURPINDER SINGH JAISWAL
REGN. NO. RQP/CAL/151/90/A

MODIFICATION TO THE APPROVED MINING PLAN OF
DALPAHAR IRON & MANGANESE MINE OVER 101.271 Ha
IN KEONJHAR DIST., ORISSA.



CERTIFICATE

"The Progressive Mine Closure Plan complies all statutory rules, regulations, orders made by the Central or State Government, Statutory Organizations, Court etc. has been taken into consideration and wherever specific permission is required the concerned authorities will be approached.

I also give an undertaking to the effect that all measures proposed in this closure plan will be implemented in a time bound manner".

Signature of the applicant

Avin Jain
(Avin Jain)

Date :

Place : New Delhi

G. S. Jaiswal
(Dr. G. S. Jaiswal)
RQP /CAL /151 /90 /A.



CERTIFICATE

In Dalpahar Iron & Manganese Ore Mine, for an area of 101.171 hectares, "The Provisions of Mines Act, 1952, Mines Rules, 1955, Metalliferous Mines Regulation, 1961 made there under have been observed in this modification to the approved mining plan and wherever specific permissions are required, the applicant will approach to the Director General of Mines Safety".

"It is to certify that there is no serious violation of Mines Safety Rules in this mine which may jeopardize human health and safety".

"The information furnished in the modification to the approved mining plan and Progressive Mine Closure Plan is true and correct to the best of my knowledge.

Dr. GURPINDER SINGH JAISWAL
RQP/CAL/151/90/A

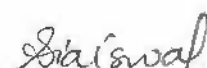
(Dr. G. S. Jaiswal)
RQP/CAL/151/90/A.

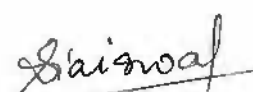


CERTIFICATE

In Dalpahar Iron & Manganese Ore Mine of Sri Avin Jain, Legal heir to Late D. C. Jain for an area of 101.171 hectares, "The Provisions of Mineral Conservations and Development Rules, 1988 made there under have been observed in the modification to the approved mining plan and wherever specific permissions are required the lessee will approach the Indian Bureau of Mines".

The information furnished in the modification to the approved mining plan and Progressive Mine Closure Plan is true and correct to the best of my knowledge.


Dr. Gulpinder Singh Jaiswal.
RQP/CAL/151/90/A.


(Dr. G. S. Jaiswal)
RQP /CAL /151 /90 /A.



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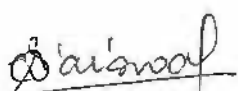
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Gaiswal
(Dr. G. S. Jaiswal)
RQP/CAL/151/90/A.



LIST OF ANNEXURES

Sl. No.	Description	Annexure No.
1.0	Copy of supplementary Lease Deed.	I
2.0	Copy of Power of Attorney.	II
3.0	Copies of Form – D.	III
4.0	Copy of approval of mining plan.	IV
5.0	Copy of RQP certificate.	V
6.0	Copy of analysis report of iron ore & Manganese ore.	VI
7.0	Feasibility report of the area.	VII
8.0	Undertaking regarding DGPS survey work.	VIII
9.0	Details of Ground Control Points.	IX
10.0	Copy of letter of grant of mining lease.	X
11.0	Copy of letter of Collector, Keonjhar for grant of surface right over 1.5 ha vide letter no. 293/Mines dated 28.01.88.	XI
12.0	Copy of Financial Assurance submitted to IBM.	XII


(Dr. G. S. Jaiswal)
RQP /CAL /151 /90 /A.



LIST OF DRAWINGS

Sl. No.	Description	Scale	Plate No.
1.0	KEY PLAN	1 : 50000	1
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7.0	DUMP PLAN & SECTIONS	1:1000	7
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INTRODUCTION

The mining lease of Dalpahar area for Iron Ore (Block No. A, B, B₁, B₂, B₃ & C) of 101.171 ha. of R.F. land under Joda P.S. in Champua Sub-division of Keonjhar district was granted vide Govt. proceeding No.III (A) MG. 101/84-6179 MG. Dt.05.06.84 annexed vide Annexure - X and was executed in favour of Dharmchand Jain for a term of 20 years w.e.f. 9th June, 1986. This grant has been affected after enactment of F.C. Act, 1980. Previously the said area was in operation by M/s. M. A. Tullock (P) Ltd. The above mining lease area fall in Baitarani R.F. No. II near village Dalpahar and is situated in the southern part of Joda west lease area of M/s TISCO Limited & about 10 km from Joda Town.

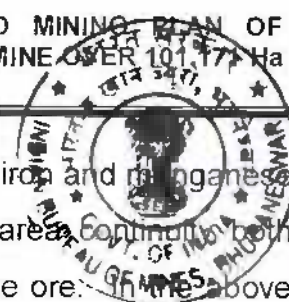
The Dalpahar Iron Ore Mines is located in Baitarani R.F-II & is bounded by Latitude - 21°58'05" to 21°58'43" N & Longitude - 85°23' to 85°24' E and featured in SOI Toposheet No.73 G/5 (Shown in (Plate No.1). The area is situated in the southern part of Joda West lease area of M/s TISCO Ltd. & about 10 Kms. from Joda Town. Dalpahar Mines Block - A is near village - Dalpahar. The lease hold area is a hilly terrain & represents an undulating topography with highest & lowest elevation of 720m & 540m above MSL respectively. The general slope of the area is toward NW.

The mining work in this area for many a year has been carried out by the Ex-lessee M/s M. A. Tullock granted in Dec, 1956 as per S.R. granted in a phase manner up to 1964. Thereafter, the work has been dispensed with. The surface right over 1.5 ha has been granted by the Collector, Keonjhar during 1993 & the present lessee has worked the area over 1.00 ha. (broken-up) for Iron Ore till 1995 & no minerals have been removed.

In course of Joint verification of the M.L. Area, it has been concluded that an area over 16.464 ha has been worked out by the ex-lessee. Initially, the Collector, Keonjhar has been pleased to grant surface right over 1.5 ha vide letter no. 293/Mines dated 28.01.88 (Annexure - XI). The mining operation in this area started on 1.4.93 & produced 1,549.750 MT of Iron Ore & at present the works have been dispensed since the approval of G.O.I, MOEF under F.C. Act, 1980 (A) has not been finalized. The forest diversion proposal is prepared for continuation of mining operation of the lease during renewal period.

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(Dr. G. S. Jaiswal)
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APPROVED
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11/10/2010
REGIONAL CONTROLLER OF MINES



Previous working in the area has developed 11 numbers of quarries in iron and manganese ore zone. Number of old manganese quarries exists showing the area continuously both laterally & at depth indicating the area is potentially rich in manganese ore. On the above basis the lessee had applied for the inclusion of manganese ore as a second mineral in the above said lessee.

There are five blocks in the lease area for iron ore in Dalpahar, PS Joda in Champua Sub-division of Keonjhar district, named as Block A, B1, B2, B3 & C. Block-wise area is as follows:

Sl. No.	Name of the Block	Area	
		Acres	Hectares
1	A	222.30	89.961
2	B1	1.50	0.607
3	B2	19.00	7.689
4	B3	2.50	1.012
5	C	4.70	1.902
Total		250.00	101.171

Out of these five Block A & Block B3 are having iron & manganese quarries of different shape & sizes. Manganese mineralization is observed in major part of the area around the above two blocks. However a float iron ore is concentrated in south western corner of the block A.

The mining plan under Rule 11 of MCDR 1988 was approved vide letter no. CAL/KJ/Fe/MP/-437 dated 04.10.96. The mine was operated by manual opencast method of mining. Now the status of mine is non-working due to want of forest clearance. As the lease was expired on 8.6.2006, the renewal application has been filed (Ref. Annexure – III) on dated 1.6.2005. Accordingly, mining plan was prepared under Rule 24A of MCR 1960 for renewal purposes and approved by Indian Bureau of Mines vide letter no. MP/OTF.MECH/27-ORI/BHU/2007-08 dated 11.01.2008 (Annexure – IV). In the approved mining plan, the proposal was given for a period of 2006-07 to 2010-11.

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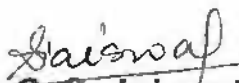


Reason for modification:

- a) TOR presentation was made before the MOEF, New Delhi. During discussions, some points were raised which require to be incorporated for the preparation of EIA/EMP.

For this reason, this modification of the approved mining plan of Dalpahar Iron & Manganese Mines has been prepared for the rest period i.e. (2010 – 11), under Rule 10 of MCDR, 1988 and submitted to Indian Bureau of Mines, Bhuvaneshwar for its approval.

In this modification, only those chapters of the approved mining plan have been considered where modification is necessary due to the reason stated above. It is supported by tables, calculations and drawings as considered necessary.


(Dr. G. S. Jaiswal)
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CHAPTER – I

1.0 GENERAL

AS PER APPROVED MINING PLAN

1.1 Name of the applicant with complete address :

Avin Jain
Legal heir of Late D.C. Jain

Permanent Address

DHARAM VILLA
12-A, Mahatma Gandhi Marg (Ring Road)
Lajpat Nagar, IV, New Delhi – 110 024
Tel : 625003 / 3002 (O), 6437519 / 4921 (R)
Fax : 6259576, Cable - DHARAM
E-mail – avinjain@yahoo.com

1.2 Status of the Applicant:

The Lessee is a private individual having experience in mining & marketing of iron & Manganese etc.

1.3 Mineral(s) which are occurring in the Area and which the Applicant intends to mine :

Applicant intends to mine both iron & Manganese ore.

1.4 Period for which Mining Lease is granted / renewed:

The mining lease area over 101.171 hecsts has been granted on 05.06.84 and executed on 09.06.1986 for a term of 20 years and the tenure of the lease was expired on 08.06.2006. The renewal application has been filed on dated 01.06.2005. Subsequently the mining plan is being prepared under Rule 24(A) of MCR 1960, Amendment – 1987.

1.5 Name, Address and Registration of RQP preparing Mining Plan.

GEOMIN CONSULTANTS (P) LTD.

267, Kharavela Nagar
Bhubaneshwar – 751001
Phone : 2392080, Fax – 2390687

E-mail : geomin@satyam.net.in

Regd No. RQP/CAL/167/92-B

Date of grant - 18.08.1992

Date of Renewal - 18.08.2000

Valid up to - 17.08.2010

G. S. Jaiswal
(Dr. G. S. Jaiswal)

RQP /CAL /151 /90 /A.



Key Persons of Company :

Dr. S.K. Sarangi
Mr. H. S. Sarangi
Mr. C. R. Mohapatra

1.6 Name of Prospecting Agency & Address :

Avin Jain
Legal heir of Late D.C. Jain

Permanent Address

DHARAM VILLA
12-A, Mahatma Gandhi Marg (Ring Road)
Lajpat Nagar, IV, New Delhi – 110 024
Tel : 625003 / 3002 (O), 6437519 / 4921 (R)
Fax : 6259576, Cable - DHARAM
E-mail – avinjain@yahoo.com

1.7 Ref. No. & Date of Letter from the State Government :

The mining lease area has been executed since 09.06.1986 for a period of 20 years. The lease was expired on 08.06.2006. Thus the mining plan is now being prepared under Rule – 24A MCR – 1960 (Amendment – 1987) for renewal purposes.

AS PER MODIFICATION TO THE APPROVED MINING PLAN

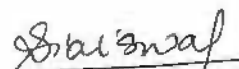
Para 1.1 to 1.4 and 1.6 is same as mentioned in the approved mining plan.

1.5 Name, Address and Registration of RQP preparing Mining Plan.

Dr Gulpinder Singh Jaiswal
B/4, Aastha Cottage,
Air Base Colony,
Kadma – 831005,
Jamshedpur.
Tele Fax : 2308439.
E-mail : gulpinder_mining@sify.com
Regd No. RQP/CAL/151/90/A.

Date of grant	-	15.02.1991
Date of Renewal	-	14.02.2001
Valid up to	-	14.02.2011

Copy of RQP certificate is enclosed as Annexure -


(Dr. G. S. Jaiswal)
RQP /CAL /151 /90 /A.



1.6 Name of Prospecting Agency & Address :

Avin Jain

Legal heir of Late D.C. Jain

Permanent Address

DHARAM VILLA

12-A, Mahatma Gandhi Marg (Ring Road)

Lajpat Nagar, IV, New Delhi - 110 024

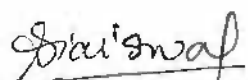
Tel : 625003 / 3002 (O), 6437519 / 4921 (R)

Fax : 6259576, Cable - DHARAM

E-mail - avinjain@yahoo.com

1.7 Ref. No. & Date of Letter from the State Government :

The mining lease area has been executed since 09.06.1986 for a period of 20 years. The lease was expired on 08.06.2006. Thus the mining plan was prepared under Rule - 24A MCR - 1960 for renewal purposes which was approved vide letter no. MP/OTF.MECH/27-ORI/BHU/2007-08 dated 11.01.2008.


(Dr. G. S. Jaiswal)
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CHAPTER – 2

2.0 LOCATION AND ACCESSIBILITY :

AS PER APPROVED MINING PLAN:

2.1 Details of the area (with location map)

District & State	:	Keonjhar in Orissa State
Taluka	:	Joda
Sub-division	:	Champua
Kharsa No./Plot No./Block	:	Baitarani R.F.
R.M.L. Area	:	101.171 hectares

Existence of public road / railway line :

There is no public road or railway line within the R.M.L. area. However, the public road i.e. Joda at a distance of road situated 8 kms away from the R.M.L. area. The nearest railway Banspani. It is 5km away from the R.M.L. area.

Toposheet No. with Latitude and Longitude :

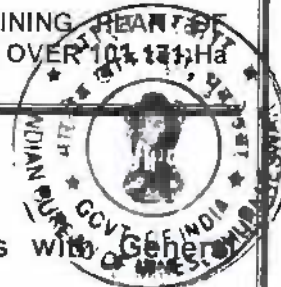
Dalpahar iron and manganese mine over 101.171 hectares is coming within the Survey of India toposheet No: 73G/5. It is bounded by the latitude $21^{\circ}58'05''$ to $21^{\circ}58'43''$ N and Longitude $85^{\circ}23'$ to $85^{\circ}24'E$.

Landuse Pattern :

The entire area falls under Baitarani reserve forest no. 11 No village is situated within the lease hold area.

Land use due to Mining Activities (Area in hectares)

Sl. No.	Pattern of Utilization	Existing
A	Mining	8.698
B	Dumping	5.620
C	Construction of building, power station, workshop, etc.	0.607
D	Construction of road	1.539
	TOTAL	16.464



2.2 Area Boundaries and Existing & Proposed Access Routes with Location and Vicinity Map)

The Dalpahar mining lease area boundaries are plotted in cadastral map on a scale of 1:2960 (16' = 1 mile) and in the key plan on a scale of 1:50,000 showing all surrounding features like road, village site etc

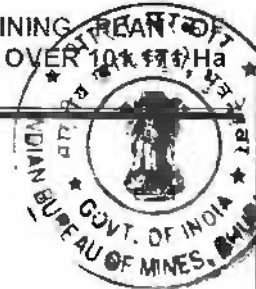
2.3 Infrastructure :

The area, being located adjacent to several working mines, has got adequate infrastructural facilities such as communication, availability of power and water resources. The area is connected by metalled road Joda at a distance of 8 Kms. The full fledged market facilities are available at Joda. Postal, hospital & educational facilities are available at Joda & Barbil. There are tube wells, dug well near by village which are very close to the lease area, which serve as a source of drinking and non-drinking purposes for the miners and the inhabitants there in. The region being an actively developed mining belt, has got adequate facilities for availability for skilled, semi-skilled and un-skilled workers. Power line and telephone facilities are available adjacent areas. The nearest railway station is at Barbil, which is at a distance of 30 KM from the lease area and the nearest railway siding is at Banspani which is at a distance of 5 kms of lease area. The area is connected by metallic road from railway station.

AS PER MODIFICATION TO THE APPROVED MINING PLAN:

No change. Same as mentioned in the approved mining plan.

G. S. Jaiswal
(Dr. G. S. Jaiswal)
RQP /CAL /151 /90 /A.



CHAPTER – 3

3.0 GEOLOGY & EXPLORATION

3.1 Topography, drainage, general geology & local / mine geology of the mineral deposit.

3.1.1 Topography

Same, as mentioned in the approved mining plan.

3.1.2 Drainage

Same, as mentioned in the approved mining plan.

3.1.3 General Geology:

Same, as mentioned in the approved mining plan.

3.1.4 Local Geology

Same, as mentioned in the approved mining plan.

Description of the rock types:

Same, as mentioned in the approved mining plan.

3.2 Geological Plan :

Same, as mentioned in the approved mining plan.

3.3 Geological Sections

Same, as mentioned in the approved mining plan.

3.4 Broad indication of the year wise exploration programme.

As per approved mining plan:

As discussed earlier geological plan has been prepared on a scale of 1:2000 and the different litho units have been plotted along with the existing quarries. The litho-boundaries

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of the different formation have been given, based on field survey & geological mapping. The ore body configuration and maximum depth attained by the respective quarries, both iron & manganese ore zone formed the basis of preparation of this mining plan. Other than existing quarry no other exploration work has been carried out in the lease hold area. However, to prove the barrenness of dumping area, 20 no. of bore holes have been proposed at suitable location in second year of approved plan period.

Ten number of bore holes (DBH₁ – DBH₁₀) has been proposed to the western side of shale patch for proposed manganese dump during 2nd year to prove their barrenness and Ten number of bore holes (DBH₁₁ – DBH₂₀) have been proposed to the western side of block – B for iron proposed dump during 2nd year to prove their barrenness. For further additional reserve an exploration schedule consisting of 10 bore holes (IBH₁ – IBH₁₀) has been chalked out from 2nd year to 5th year for iron ore zone in 1000m x 100x grid pattern in form of core drilling and 255 no. of proposed bore holes MBH₁ – MBH₂₅₅ has been chalked out from 2nd year to 5th year for manganese ore zone in 50m x 50m grid pattern in form of DTH drill hole (Ref. Table below).

Year	Proposed Borehole		Total meterage to be drilled	Remarks
	Iron (Core drilling in 100m x 100m grid pattern)	Manganese (DTH drilling in 50m x 50x grid pattern)		
2 nd year (2007-08)	DBH ₁₁ – DBH ₂₀	DBH ₁ – DBH ₁₀	Up to the end of mineralization	To prove the barrenness
	IBH ₁ – IBH ₄	MBH ₁ – MBH ₆₀		
3 rd year (2008-09)	IBH ₅ – IBH ₆	MBH ₆₁ – MBH ₁₂₅		To prove the depth continuity of the ore
4 th year (2009-10)	IBH ₇ – IBH ₈	MBH ₁₂₆ – MBH ₁₉₀		
5 th year (2010-11)	IBH ₉ – IBH ₁₀	MBH ₁₉₁ – MBH ₂₅₅		

As per this modification to the approved mining plan:

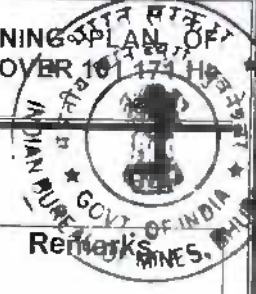
As stated earlier, the mine was not started in this plan period till now due to forest clearance. As such, no exploration was carried out as proposed in the approved mining plan. Now, as only one year is left, exploration programme has been chalked for one year only. Exploration by DTH is proposed in both iron and manganese ore zone in order to

- Define the ore zone boundary very clearly
- To obtain more information in virgin area on different parameters of the ore zone like – thickness, grade, recovery etc.
- To have a more comprehensive idea about +45% Fe ore zone & +10%Mn ore zone in compliance to circular no. 3/2010.
- To achieve higher reliability in the estimated reserves, that is, to convert the probable reserves into proved category etc.

The proposed exploration in iron and manganese ore sector is given below:

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Iron Ore sector:

Year	No. of Holes (DTH)	Collar RL	Location	Depth of the Hole	Total meterage	Remarks
5 th year (2010-11)	IBH - 1	558.79	In & around iron ore quarry	20m	100 m	To prove the lateral as well as depth continuity of the ore body.
	IBH - 2	570.00				
	IBH - 3	568.27				
	IBH - 4	564.79				
	IBH - 5	581.32				

Manganese Ore sector:

Year	No. of Holes (DTH)	Collar RL	Location	Depth of the Hole	Total meterage	Remarks
5 th year (2010-11)	MBH - 1	685.188	In & around quarry no.-7	20m	140 m	To prove the lateral as well as depth continuity of the ore body.
	MBH - 2	695.520				
	MBH - 3	685.310				
	MBH - 4	700.980				
	MBH - 5	710.090				
	MBH - 6	715.430				
	MBH - 7	717.840				
	MBH - 8	610.980	In & around quarry no.-4	20m	160	To prove the lateral as well as depth continuity of the ore body.
	MBH - 9	622.850				
	MBH - 10	630.020				
	MBH - 11	632.680				
	MBH - 12	632.080				
	MBH - 13	643.230				
	MBH - 14	637.370				
	MBH - 15	625.350				

The location of these proposed bore holes are shown in Geological Plan (Plate - 4).

3.5 Geological and Recoverable Reserves and Grade :

Method of Estimation of Reserves :

As per approved mining plan:

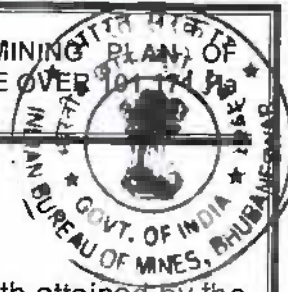
Area under reference of two prominent ore deposits known as iron and manganese. Reserve has been estimated by cross-sectional area method.

Cross sectional area method

A total of 8 number of cross sections from boundary to boundary have been prepared. Reserve of tow ore deposits have been estimated by cross sectional area method. Cross sectional area measured in sections is multiplied with the respective length of influence of each section and bulk density to have geological reserve under proved, probable and possible categories.

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Type of Reserve

Iron

- Proved - Depth have been taken upto the maximum depth attained by the existing quarry.
- Probable - Probable depth have been taken upto 5 m from the proved limit.
- Possible - Possible depth has been taken upto 5 m from the probable limit.

Manganese

- Proved - Proved zone have been taken upto the existing quarry depth attained by the respective section and laterally 10m both sides from existing quarry faces.
- Probable - Probable zone have been taken down below the proved zone and 10m laterally from proved limit.
- Possible - Possible zone have been taken upto 5 m down below the probable ore zone & 5 m laterally from probable limit.

Ore reserves have been calculated by cross-sectional area method for proved, probable & possible category. Parameters considered for estimation of proved, probable and possible reserves of iron ore by cross sectional area method are :

Section considered	450S, 500S, 600S
Length of influence	450S - 100m 500S - 75m 600S - 100m
Incidence factor	0.50
Bulk density	3.00

Dimension of the Quarries

Name of the quarry	Name of the ore	Average of Length (m)	Average Breadth (m)	Maximum Depth (m)	Area (m ²)
Iron quarry	Iron	70m	50m	12	3500 m ²
Quarry - ½	Manganese	300m	143.6m	14	43080 m ²
Quarry - 3	Manganese	100m	50m	08	5000 m ²
Quarry - 5	Manganese	70m	70m	06	4900 m ²
Quarry - 6	Manganese	140m	100m	04	14000 m ²
Quarry - 4	Manganese	50m	50m	10	2500 m ²
Quarry - 4A	Manganese	90m	50m	14	4500 m ²
Quarry - 4B	Manganese	60m	25m	01	1500 m ²
Top quarry	Manganese	80m	80m	08	6400 m ²
Quarry - 7	Manganese	30m	20m	04	600 m ²
Quarry - 7B	Manganese	40m	25m	06	1000 m ²

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Parameters considered for estimation of proved, probable and possible manganese ore by cross sectional area method are:

Section considered	450N, 400N, 300N, 200N, 100N, 50N 200S, 300S, 450S, 500S, 600S
Length of influence	450N - 90m 400N - 75m 300N - 100m 200N - 100m 100N - 75m 50N - 100m 200S - 100m 300S - 100m 450S - 100m 500S - 75m 600S - 40m
Incidence factor	0.25*
Bulk density	2.50

Since the mine was non operative for a long period the recovery factor has been taken from the adjacent mines. However the actual recovery factor of the mine will be intimated to IBM after observing one year of mining operation. The geological reserve so estimated for iron and manganese ore as mentioned in the approved mining plan is given hereunder.

GEOLOGICAL RESERVE

(IRON)

SL. NO	Name of Section	Sectional Area (m ²)	Length of influence (m)	Volume of ore zone (m ³)	Recovery Factor (50%)	Tonnage factor	Quantity of ore (MT)
Proved	450S	2200	100	220000	110000	3.0	330000
	500S	2500	75	187500	93750	3.0	281250
	600S	2800	100	280000	140000	3.0	420000
	Total :-			687500	343750		1031250
Probable	450S	1100	100	110000	55000	3.0	165000
	500S	1250	75	93750	46875	3.0	140625
	600S	1100	100	110000	55000	3.0	165000
	Total			313750	156875		470625
Possible	450S	1100	100	110000	55000	3.0	165000
	500S	1250	75	93750	46875	3.0	140625
	600S	1100	100	110000	55000	3.0	165000
				313750	156875		470625
Grand Total :-				1315000	657500		1972500

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(Manganese)

Category	Name of Section	Sectional area (m ²)	Length of influence (m)	Volume of ore zone (m ³)	Recovery factor (25%)	Tonnage factor	Quantity of ore (MT)
Proved	450N	5400	90	486000	121500	2.5	30375
	400N	2000	75	150000	37500	2.5	93750
	300N	2800	100	280000	70000	2.5	175000
	200N	1000	100	100000	25000	2.5	62500
	100N	800	75	60000	15000	2.5	37500
	50N	8900	100	80000	20000	2.5	50000
	300S	1600	100	160000	40000	2.5	100000
	450S	1200	100	120000	30000	2.5	75000
	Total			1436000	359000		897500
Probable	450N	6400	90	57600	144000	2.5	36000
	400N	3000	75	225000	56250	2.5	140625
	300N	3400	100	340000	85000	2.5	212500
	200N	2000	100	200000	50000	2.5	12500
	100N	2800	75	210000	52500	2.5	131250
	50N	2100	100	210000	52500	2.5	131250
	300S	2200	100	220000	55000	2.5	137500
	450S	2000	100	200000	50000	2.5	125000
	Total			2181000	545250		1363125
Possible	450N	3200	90	288000	72000	2.5	180000
	400N	1400	75	105000	26250	2.5	65625
	300N	1800	100	180000	45000	2.5	112500
	200N	1000	100	100000	25000	2.5	62500
	100N	1400	75	105000	26250	2.5	65625
	50N	1000	100	100000	25000	2.5	62500
	200S	2000	100	200000	50000	2.5	125000
	300S	1100	100	110000	27500	2.5	68750
	450S	1000	100	100000	25000	2.5	62500
	500S	1680	75	126000	31500	2.5	78750
	600S	1450	40	58000	14500	2.5	36250
	Total			1472000	368000		920000
Grand Total				5089000	1272250		3180625

As per this modification to the approved mining plan:

Area under reference is rich in two prominent ore deposits known as iron and manganese. Reserve has been estimated by cross-sectional area method.

Method of Estimation of Reserves :

Same as mentioned in the approved mining plan. Reserve of iron and manganese ore deposits have been estimated by cross sectional area method. Cross sectional area measured in sections is multiplied with the respective length of influence of each section and bulk density to have geological reserve under proved, probable and possible categories.

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Parameters considered for estimation of proved, probable and possible reserves

Cut-off grade:

Iron ore section:

In the present market scenario, cut-off grade for iron ore is considered at 57% Fe as because iron ore up to 57% Fe has got market. Below 57% Fe and up to 45% Fe material is considered as sub-grade and below 45% Fe is waste.

Manganese ore section

The cut-off grade for manganese is considered at 20% Mn because marketable grade of manganese is being obtained by blending the lower grade with higher grade ore. Below 20% Mn and up to 10% Mn material is considered as sub-grade and below 10% Mn is waste.

Recovery:

i) Iron ore section:

The recovery of saleable ore (+57%Fe) is 50% of the total excavation in ore zone whereas recovery of material between +45% to -57%Fe (sub-grade) is 10% of the total excavation of ore zone.

ii) Manganese ore section:

Recovery of saleable manganese ore (+20% Mn) from the ore zone is considered as 25% and sub grade (-20% to +10%) Mn is 10% of the total excavation of the ore zone. Below that all the material is considered as waste.

Bulk density:

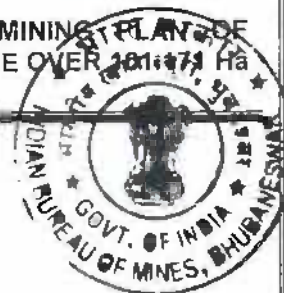
For iron ore - 1 cum = 3.0 MT

For Manganese ore - 1 cum = 2.5 MT.

Section line and length of influence considered is same as mentioned in the approved mining plan. As stated earlier, mining lease expired on 2006 and presently under renewal. The work in the said mine is suspended due to want of forestry clearance as well as environment clearance. As such, the status of the mine is same as was at the time of preparation of the mining plan.

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GEOLOGICAL RESERVE

A. IRON ORE

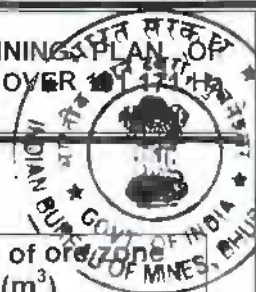
SL. NO	Section Line	Sectional Area (m ²)	Length of influence (m)	Volume of iron ore zone (m ³)
Proved (Measured)	450S	2200	100	220000
	500S	2500	75	187500
	600S	2800	100	280000
	Total :-			687500
Probable (Indicated)	450S	1100	100	110000
	500S	1250	75	93750
	600S	1100	100	110000
	Total			313750
Possible (Inferred)	450S	1100	100	110000
	500S	1250	75	93750
	600S	1100	100	110000
				313750
Grand Total :-				1315000

Table showing estimated Geological Reserve of Iron Ore

SL. NO	Volume of Iron ore zone	Recovery (cum)		Tonnage factor	Geological Reserve in (MT)	
		saleable Iron ore (+57%Fe)	Non-saleable ore (S/G) (+45% to 57%Fe)		saleable Iron ore (+57%Fe)	Non-saleable ore (S/G) (+45% to 57%Fe)
	(cum)	(50% of Excavation)	(10% of Excavation)			
Proved (Measured)	687500	343750	68750	3.0	1031250	206250
Probable (Indicated)	313750	156875	31375	3.0	470625	94125
Total	1001250	500625	84437		1501875	300375
Possible (Inferred)	313750	156875	31375	3.0	470625	94125
G. Total	1315000	657500	115812		1972500	394500

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B. MANGANESE ORE

Category	Section Line	Sectional area (m ²)	Length of influence (m)	Volume of ore zone (m ³)
Proved (Measured)	450N	5400	90	486000
	400N	2000	75	150000
	300N	2800	100	280000
	200N	1000	100	100000
	100N	800	75	60000
	50N	8900	100	80000
	300S	1600	100	160000
	450S	1200	100	120000
	Total			1436000
Probable (Indicated)	450N	6400	90	57600
	400N	3000	75	225000
	300N	3400	100	340000
	200N	2000	100	200000
	100N	2800	75	210000
	50N	2100	100	210000
	300S	2200	100	220000
	450S	2000	100	200000
	Total			2181000
Possible (Inferred)	450N	3200	90	288000
	400N	1400	75	105000
	300N	1800	100	180000
	200N	1000	100	100000
	100N	1400	75	105000
	50N	1000	100	100000
	200S	2000	100	200000
	300S	1100	100	110000
	450S	1000	100	100000
	500S	1680	75	126000
	600S	1450	40	58000
	Total			1472000
Grand Total				5089000

Table showing estimated Geological Reserve of Manganese Ore

Category	Volume of Mn ore zone (cum)	Recovery (cum)		Tonnage factor	Geological reserve of Mn ore (MT)	
		Saleable Mn ore(+20% Mn) 25% of Excavation	Non-saleable (S/G) (+10% to -20%Mn) 10% of the excavation		Saleable Mn ore(+20% Mn)	Non-saleable (S/G) (+10% to -20%Mn)
Proved	1436000	359000	143600	2.5	897500	359000
Probable	2181000	545250	218100	2.5	1363125	545250
Total	3617000	904250	361700	2.5	2260625	904250
Possible	1472000	368000	147200	2.5	920000	368000
G. Total	5089000	1272250	508900		3180625	1272250

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3.6 Reserve & Grade

As per approved mining plan:

Type	Geological Reserve in MT			
	Iron	Average Grade	Manganese	Average Grade
Proved (Measured)	1031250	62.90% Fe	897500	45.97% Mn
Probable (Indicated)	470625		1363125	
S. Total	1501875		2260625	
Possible (Inferred)	470625		920000	
G. Total	1972500		3180625	

The average chemical analysis of iron & manganese ore samples are given below:

Average Grade of Iron Ore			
Fe%	SiO ₂ %	Al ₂ O ₃ %	P%
62.90	4.16	3.06	0.045

Average Grade of Manganese Ore				
Mn%	Fe%	SiO ₂ %	Al ₂ O ₃ %	P%
45.97	7.09	3.32	3.99	0.057

As per this modification to the approved mining plan:

Type	Geological Reserve in MT			
	Iron Ore		Manganese Ore	
	+ 57% Fe	+45% to - 57% Fe	+ 20% Mn	+10% to - 20% Mn
Proved (Measured)	1031250	206250	897500	359000
Probable (Indicated)	470625	94125	1363125	545250
S. Total	1501875	300375	2260625	904250
Possible (Inferred)	470625	94125	920000	368000
G. Total	1972500	394500	3180625	1272250

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The average chemical analysis of iron & manganese ore samples are given below

Average Grade of Iron Ore			
Fe%	SiO ₂ %	Al ₂ O ₃ %	P%
62.90	4.16	3.06	0.045

Average Grade of Manganese Ore				
Mn%	Fe%	SiO ₂ %	Al ₂ O ₃ %	P%
45.97	7.09	3.32	3.99	0.057

3.7 Mineable reserve & anticipated life of the mine

As per approved mining plan:

The reserve computed under proved, probable & possible category of iron and manganese ore reserve have been summed up and kept under demonstrated category, which is estimated to be 1972500 MT & 3180625 MT. Mineable reserves have been estimated by cross – sectional area method excluding the ore blocked up under mining lease boundary and the ore left out due to slope factor under proved, probable & possible category for both iron & manganese. The mineable reserve thus computed for iron & manganese ore are 1880625 MT & 3106000 MT.

MINEABLE RESERVE:

(IRON)

Category	Name of Section	Sectional area (m ²)	Length of influence (m)	Volume of ore zone (m ³)	Recovery factor (50%)	Tonnage factor	Quantity of ore (MT)
Proved	450S	2100	100	210000	105000	3.0	315000
	500S	2400	75	180000	90000	3.0	270000
	600S	2800	100	280000	140000	3.0	420000
	Total			670000	33500		10050000
Probable	450S	1000	100	100000	50000	3.0	150000
	500S	1150	75	86250	43125	3.0	129375
	600S	1100	100	110000	55000	3.0	165000
	Total			296250	148125		444375
Possible	450S	950	100	95000	47500	3.0	142500
	500S	1100	75	82500	41250	3.0	123750
	600S	1100	100	110000	55000	3.0	165000
	Total			287500	143750		431250
Grand Total				1253750	626875		1880625

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(MANGANESE)

Category	Name of Section	Sectional area (m ²)	Length of influence (m)	Volume of ore zone (m ³)	Recovery factor (25%)	Tonnage factor	Quantity of ore (MT)
Proved	450N	5300	90	477000	119250	2.5	298125
	400N	1900	75	142500	35625	2.5	89062.5
	300N	2700	100	270000	67500	2.5	168750
	200N	900	100	90000	22500	2.5	56250
	100N	700	75	52500	13125	2.5	32812.5
	50N	800	100	80000	20000	2.5	50000
	300S	1600	100	160000	40000	2.5	100000
	450S	1200	100	120000	30000	2.5	75000
	Total			1392000	348000		870000
Probable	450N	6300	90	567000	141750	2.5	354375
	400N	2900	75	217500	54375	2.5	135937.5
	300N	3300	100	330000	82500	2.5	206250
	200N	1900	100	190000	47500	2.5	118750
	100N	2700	75	202500	50625	2.5	126562.5
	50N	2100	100	210000	52500	2.5	131250
	300S	2200	100	220000	55000	2.5	137500
	450S	2000	100	200000	50000	2.5	125000
	Total			2137000	534250		1335625
Possible	450N	3140	90	282600	70650	2.5	176625
	400N	1360	75	102000	25500	2.5	63750
	300N	1750	100	175000	43750	2.5	109375
	200N	950	100	95000	23750	2.5	59375
	100N	1360	75	102000	25500	2.5	63750
	50N	1000	100	100000	25000	2.5	62500
	200S	1950	100	195000	48750	2.5	121875
	300S	1100	100	110000	27500	2.5	68750
	450S	1000	100	100000	25000	2.5	62500
	500S	1640	75	123000	30750	2.5	76875
	600S	1400	40	56000	14000	2.5	3500
	Total			1440600	360150		900375
Grand Total				4969600	1242400		3106000

Summary of Mineable Reserve

Type	Quantity (MT)			
	Iron	Average Grade	Manganese	Average Grade
Proved	1005500	62.90% Fe	870000	45.97% Mn
Probable	444375		1335625	
S. Total	1449375		2205625	
Possible	431250		900375	
G. Total	1880625		3106000	

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UNFC Classification

Iron Ore		
Classification	Code	Quantity Mt
Mineral Reserve	111	1005000
	121	444375
Mineral Resource	221	26250
	222	26250
	333	431250
	334	39375

Manganese Ore		
Classification	Code	Quantity Mt
Mineral Reserve	111	870000
	121	1335625
Mineral Resource	221	27500
	222	27500
	333	900375
	334	19625

With the ensuing proposed average production target of 2,00,000 MT / year of iron ore & 70,000 Mt of manganese ore, the life of the mine would be around 8 years & 32 year respectively. However, this projection of life of the mine is again depending upon the mode of excavation, extent of mechanization and consumers demand.

As per this modification to the approved mining plan:

In the approved mining plan, mineable reserve has been estimated by considering proved, probable and possible reserve instead of proved and probable reserve. As such, the mineable reserve has been recast on the line of proved and probable reserves only and given below.

Mineable Mineral Reserve:

Mineable reserve is that part of reserve which can be calculated based on taking ultimate pit slope of the working leaving 7.5m from the lease boundary. While assessing the mineable reserves of the deposit, Proved and Probable categories of mineral resources have been considered and accordingly the mineable reserves are calculated assuming loss due to pit slope, loss due to nala, road, high tension electric line and its proximity with the lease boundary. The mineable reserve of iron ore for this area has been calculated and given in Table below.

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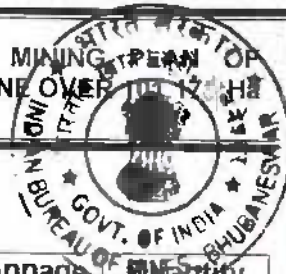
A. IRON ORE

Category	Section Line	Sectional area (m ²)	Length of influence (m)	Volume of Iron ore zone (m ³)
Proved	450S	2100	100	210000
	500S	2400	75	180000
	600S	2800	100	280000
	Total			670000
Probable	450S	1000	100	100000
	500S	1150	75	86250
	600S	1100	100	110000
	Total			296250
Grand Total				966250

Table showing estimated Mineable Mineral Reserve of Iron Ore

Category	Volume of Iron ore zone (cum)	Recovery (cum)		Tonnage factor	Mineable Reserve in (MT)	
		saleable Iron ore (+57%Fe) (50% of Excavation)	Non-saleable ore (S/G) (+45% to - 57%Fe) (10% of Excavation)		saleable Iron ore (+57%Fe)	Non-saleable ore (S/G) (+45% to - 57%Fe)
Proved	670000	335000	67000	3.0	1005000	201000
Probable	296250	148125	29625	3.0	444375	88875
Total	966250	483125	96625		1449375	289875

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B. MANGANESE ORE

Category	Name of Section	Sectional area (m ²)	Length of influence (m)	Volume of ore zone (m ³)	Recovery factor (25%)	Tonnage factor	Quantity of ore (MT)
Proved	450N	5300	90	477000	119250	2.5	298125
	400N	1900	75	142500	35625	2.5	89062.5
	300N	2700	100	270000	67500	2.5	168750
	200N	900	100	90000	22500	2.5	56250
	100N	700	75	52500	13125	2.5	32812.5
	50N	800	100	80000	20000	2.5	50000
	300S	1600	100	160000	40000	2.5	100000
	450S	1200	100	120000	30000	2.5	75000
	Total			1392000	348000		870000
Probable	450N	6300	90	567000	141750	2.5	354375
	400N	2900	75	217500	54375	2.5	135937.5
	300N	3300	100	330000	82500	2.5	206250
	200N	1900	100	190000	47500	2.5	118750
	100N	2700	75	202500	50625	2.5	126562.5
	50N	2100	100	210000	52500	2.5	131250
	300S	2200	100	220000	55000	2.5	137500
	450S	2000	100	200000	50000	2.5	125000
	Total			2137000	534250		1335625
Grand Total				3529000	882250		2205625

Table showing estimated Mineable Mineral Reserve of Manganese Ore

Category	Volume of Mn ore zone (cum)	Recovery (cum)		Tonnage factor	Mineable reserve of Mn Ore (MT)	
		Saleable Mn ore(+20% Mn) 25% of Excavation	Non-saleable (S/G) (+10% to -20%Mn) 10% of the excavation		Saleable Mn ore(+20% Mn)	Non-saleable (S/G) (+10% to -20%Mn)
Proved	1392000	348000	139200	2.5	870000	348000
Probable	2137000	534250	213700	2.5	1335625	534250
Total	3529000	882250	352900	2.5	2205625	882250

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Gist of the Mineable Reserve

Category	Iron Ore (MT)			Manganese Ore (MT)		
	Mineable		Non-mineable	Mineable		Non-mineable
	+57% Fe	+45% to - 57% Fe		+20% Mn	+10% to - 20% Mn	
Proved	1005000	201000	31500	870000	348000	38500
Probable	444375	88875	31500	1335625	534250	38500
Total	1449375	289875	63000	2205625	882250	77000

Classification of Reserves/Resources as per UNFC:

UNFC system has been adopted to categorize the mineral Resources/Reserves: For the estimation of different mineral resources, Occurrences of mineral of intrinsic economic interest, location, grade, quantity, geological characteristic etc has been studied in detailed and are given hereunder:

Proved Mineral Reserve:

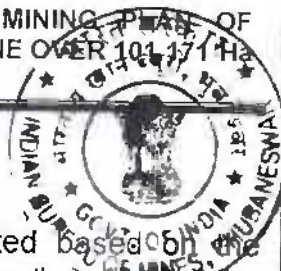
Geological axis - Detailed geological survey has been carried out, surface exposures have been found, exploration done in past by trial pits which later on converted into quarries, number of pits were opened. These scattered small and large quarries showing presence of iron and manganese ore covers the extensive part of the lease area and thus the mineralized zone has been demarcated based on that. The proved reserve has been estimated based on the actual thickness of the ore body as exposed in quarry faces. This thickness of the ore body is kept under proved category because of greater level of confidence on the basis of exposures on the surface as well as in the quarries. Thus, the reserves estimated can be brought under G1.

Feasibility axis - Mining plan was prepared and approved. The recoveries and efficiencies estimated. Manpower/machine requirement has been estimated based on actual need. Forest Diversion Proposal has been prepared and cleared but again applied under renewal case which is expected soon. Lessee has got the TOR for Environmental clearance, EIA/EMP of the project is under preparation and it is expected that lessee will get the environmental clearance soon. Thus, the resources can be brought under F2.

Economic axis - since the end use, land use pattern, working plan is already known or designed, the reserves can be brought under E1.

Thus Proved reserves can be classified under 121 group.

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Probable Mineral Reserve :

Geological axis - The proved mineralized zone has been demarcated based on surface exposures and extensive old workings in the area. The wall as well as floor of the old pits indicates the existence of ore both laterally as well as in depth. Thus, based on that, the thickness of this probable zone is considered further 5m below the proved zone. This thickness of the ore body is kept under probable category assuming that the ore body may continue further. Thus, the reserves estimated can be brought under G2.

Feasibility axis - Mining plan was prepared and approved. At present mining work is suspended due to forest and environment clearance. Leasehold area is under renewal but under deemed extension valid as per the rule of M.C.R. 1960. There will be no displacement. Thus, the resources can be brought under F2.

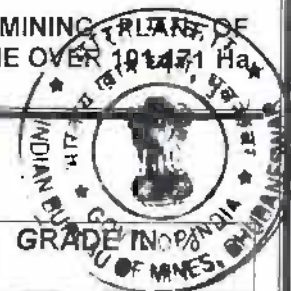
Economic axis - On the economic front, based on previous extraction of Iron ore in the area, the grade of iron ore is assumed to be the same. Hence it can be grouped under E1. Thus Probable reserves can be classified under 122 groups.

Thus the mineable reserve of iron and manganese ore so estimated can be presented as follows under UNFC classification:

PRESENTATION OF MINERAL RESOURCES AS PER UNFC IRON ORE

Total Resources	CATEGORY	CODE	QUANTITY IN MT	GRADE IN %
	(A + B)	-	2367000	+45%Fe
A. Reserved	Proved	(111)	-	+ 57% Fe
	Probable	(121)	1005000	
		(122)	444375	
B. Remaining Resources	Feasibility Mineral Resources	(211) (S/G) (N/M)	201000 31500	+ 45 to - 57% Fe + 57% Fe
	Pre-feasibility Mineral Resources	(222) (S/G) (N/M)	88875 31500	+ 45 to - 57% Fe + 57% Fe
	Measured Mineral Resources	(331)	-	
	Indicated Mineral Resources	(332)	-	
	Inferred Mineral Resources	(333)	564750	
	Reconnaissance Mineral Resources	(334)	-	

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MANGANESE ORE

	CATEGORY	CODE	QUANTITY IN MT	GRADE
Total Resources	(A + B)	-	4452875	-
Reserved	Proved	(111)	-	+ 20% Mn
	Probable	(121)	870000	
		(122)	1335625	
B. Remaining Resources	Feasibility Mineral Resources	(211) (S/G) (N/M)	348000 38500	+10% to - 20%Mn + 20% Mn
	Pre-feasibility Mineral Resources	(222) (S/G) (N/M)	534250 38500	+10% to - 20%Mn + 20% Mn
	Measured Mineral Resources	(331)	-	
	Indicated Mineral Resources	(332)	-	
	Inferred Mineral Resources	(333)	1288000	
	Reconnaissance Mineral Resources	(334)	-	

Anticipated life of the mine :

As the modification is made of the rest period of one year considering a production target of 202500 MT for iron ore and 69625 MT for manganese ore, the life of the mine is calculated and given below:

Parameters	Iron Ore	Manganese Ore
Mineable reserve (MT)	1449375	2205625
Proposed Production Target (MT)	202500	69625
Life of the Mine (Years)	7.15	31.68

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CHAPTER – 4

4.0 MINING

a) Briefly describe the existing / proposed method for developing/working the deposit with all design parameters.

AS PER APPROVED MINING PLAN:

The category of mine is other than fully mechanized (OTFM) Category – A. In the lease hold there are nine numbers of quarries - one in iron & eight in manganese ore zone. The M.L. area is being represented by iron ore zone, magniferous laterite, laterite shale and soil – alluvium. Most of this area on the western part is represented by soil alluvium and shale. The iron & manganese ore quarries are located in the northern eastern and southern part of the M.L. area. Opencast and semi-mechanized mining method has been adopted to raise the ore by using equipments such as jack-hammer, compressor, jeep and tipper, etc. Now it is proposed to continue the mining on a single shift basis with open cast mining methods.

AS PER THIS MODIFICATION TO THE APPROVED MINING PLAN:

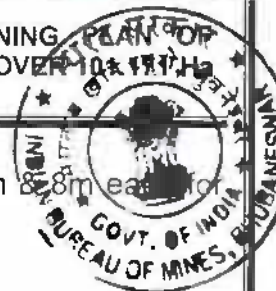
Brief description about method of mining:

In the approved mining plan, mining by opencast other than fully mechanized (OTFM) method was proposed for developing or working in the mine on single shift basis. The machineries to be used were Excavator, Loader, Jack-hammer drills, compressors, truck/tippers etc. Besides these, some equipment for manual working like hammer, basket, hand shovel, crowbars etc were also proposed. Haul roads are well developed. Starting from the north-western corner of the lease area, road extends to the all working and non-working quarries at suitable gradient.

Continuation of mining operation by opencast semi-mechanized method with the help of Tata Hitachi Excavator, JCB Loader, drilling machines (Jack-hammer), associated compressor, tippers and other auxiliary equipments for safety is proposed for the ensuing for the rest one year of modification to the approved mining plan period. All total three nos. of quarries are proposed to be worked, one in iron & two in manganese ore zone with a proposed fifth year production target of 202500 MT of iron ore & 69625 MT of manganese

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ore per annum respectively. Height & width of the bench will be kept at 6m & 8m respectively for both iron and manganese ore zone. The overall slope will be less than 37° .

Manganese ore and iron ore zone will be required blasting. Drilling of blast holes will be done by wagon drills & jack hammers. Hard rock mass will be loosened by drilling & blasting. Excavation & Loading will be done by semi-mechanized for iron ore & manual for manganese ore. Dumpers will be deployed for transportation of iron ore to the various consuming industries on contract basis.

b) Indicate quantum of development and tonnage and grade of production expected pit-wise:

AS PER APPROVED MINING PLAN:

The year wise development of the quarry for the first five years has been projected with the extension of the existing iron & manganese quarries with systematic development of benches of 5 m height and width for iron and 3 m height & width for manganese ore. Steps are proposed to be provided along the bench slopes to facilitate the movement of workers. It is to be mentioned here that the generation of top-soil is observed to be nil as projected mining for both iron & manganese ore zone have been outlined on the lateritic top. The details layout of the proposed quarry & sections are indicated in Plat – IVA, IVB & IVC.

For Iron Ore

The mining & Development activities have not been carried out during the year 2006-07 due to forest constraints. However the production was envisaged for the 2nd year 2007-08.

Development during Second year (2007-2008)

Description	Proposed Quarry – 1
Section Considered	MN & OP
R. L. of quarry floor at the end of year (m)	545
Length of influence (m)	135
Height / width of the bench (m/m)	5m/5m
Over all slope of quarry	45°

Summary :

Production of ore	=	3,11,850 MT
Sub – grade	=	$20,790 \text{ m}^3$
Overburden	=	Nil
Intercalated waste	=	83160 m^3
Non-saleable materials	=	$20790 + 83160 = 103950$
Stripping ration (t/m ³)	=	1:0.33

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Development during Third year (2008-2009)

Description	Proposed Quarry -
Section Considered	MN & OP
R. L. of quarry floor at the end of year (m)	545
Length of influence (m)	135
Height / width of the bench (m/m)	5m/5m
Over all slope of quarry	45°

Summary :

Production of ore	=	170100 MT	
Sub - grade	=	11340 m ³	
Overburden	=	Nil	
Intercalated waste	=	45360 m ³	
Non-saleable materials	=	11340 + 45360	= 56700
Stripping ration (t/m3)	=	1:0.33	

Development during Fourth year (2009-2010)

Description	Proposed Quarry - 1
Section Considered	MN & OP
R. L. of quarry floor at the end of year (m)	555
Length of influence (m)	100
Height / width of the bench (m/m)	5m/5m
Over all slope of quarry	45°

Summary :

Production of ore	=	174150 MT	
Sub -- grade	=	11610 m ³	
Overburden	=	Nil	
Intercalated waste	=	46440 m ³	
Non-saleable materials	=	11340 + 45360	= 58050
Stripping ration (t/m3)	=	1:0.33	

Development during Fifth year (2010-2011)

Description	Proposed Quarry - 1
Section Considered	MN & OP
R. L. of quarry floor at the end of year (m)	560
Length of influence (m)	135
Height / width of the bench (m/m)	5m/5m
Over all slope of quarry	45°

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Summary :

Production of ore	=	202500 MT	
Sub – grade	=	13500 m ³	
Overburden	=	Nil	
Intercalated waste	=	54000 m ³	
Non-saleable materials	=	13500 + 54000	= 67500
Stripping ration (t/m ³)	=	1:0.33	

For Manganese Ore

The mining & development activities have not been carried out during the year 2006-07 due to forest constraints. However, the production as envisaged for the 2nd year 2007-08.

Development during Second year (2007-2008)

Description	P Q – 2	P Q 3
Section Considered	QR & ST	UV, WX
R. L. of quarry floor at the end of year (m)	647	648
Length of influence (m)	90	130
Height / width of the bench (m/m)	3/3	3/3
Over all slope of quarry	45 ⁰	45 ⁰

Summary :

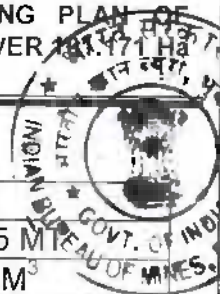
Description	P Q – 2	P Q 3	Total
Production of ore	43875 MT	48750 MT	92625 MT
Sub – grade	7020 M ³	7800 M ³	14820 M ³
Overburden	Nil	Nil	Nil
Intercalated waste	45630 m ³	50770 m ³	96400 m ³
Non-saleable materials	7020 + 45630 52650 m ³	7800 + 50770 58500 m ³	14820 + 96400 111220 m ³
Stripping ration (t/m ³)	1:1.20	1:1.20	1:1.20
Non salable material (m ³)			

Development during Third year (2008-2009)

Description	P Q – 2	P Q 3
Section Considered	QR & ST	UV, WX
R. L. of quarry floor at the end of year (m)	653	654
Length of influence (m)	90	130
Height / width of the bench (m/m)	3/3	3/3
Over all slope of quarry	45 ⁰	45 ⁰

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Summary :

Description	P Q - 2	P Q 3	Total
Production of ore	32625 MT	29250 MT	61875 MT
Sub - grade	5220 M ³	4680 M ³	9900 M ³
Overburden	Nil	Nil	Nil
Intercalated waste	33930 m ³	30420 m ³	64350 m ³
Non-saleable materials	5220 + 33930 39150 m ³	4680 + 30420 35100 m ³	74250
Stripping ration (t/m ³) Non salable material (m ³)	1:1.20	1:1.20	1:1.20

Development during Fourth year (2009-2010)

Description	P Q - 2	P Q 3
Section Considered	QR & ST	UV, WX
R. L. of quarry floor at the end of year (m)	659	657
Length of influence (m)	90	130
Height / width of the bench (m/m)	3/3	3/3
Over all slope of quarry	45 ⁰	45 ⁰

Summary :

Description	P Q - 2	P Q 3	Total
Production of ore	32625 MT	32500 MT	65125 MT
Sub - grade	5220 M ³	5220 M ³	10420 M ³
Overburden	Nil	Nil	Nil
Intercalated waste	33930 m ³	33800 m ³	67730 m ³
Non-saleable materials	5220 + 33930 39150 m ³	5220 + 33800 39000 m ³	78150
Stripping ration (t/m ³) Non salable material (m ³)	1:1.20	1:1.20	1:1.20

Development during Fifth year (2010-2011)

Description	P Q - 2	P Q 3
Section Considered	QR & ST	UV, WX
R. L. of quarry floor at the end of year (m)	665	660
Length of influence (m)	90	130
Height / width of the bench (m/m)	3/3	3/3
Over all slope of quarry	45 ⁰	45 ⁰

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Summary :

Description	P Q - 2	P Q 3	Total
Production of ore	37152 MT	32500 MT	69625 MT
Sub - grade	5940 M ³	5220 M ³	11140 M ³
Overburden	Nil	Nil	Nil
Intercalated waste	38610 m ³	33800 m ³	72410 m ³
Non-saleable materials	5940 + 38610 44550 m ³	5220 + 33800 39000 m ³	83550
Stripping ration (t/m ³) Non salable material (m ³)	1:1.20	1:1.20	1:1.20

Of the total excavation of iron ore zone, 50% of the ore assumed to be recovered with >58% Fe content while 10% of the ore is assumed to be sub-grade having >55% to <58% Fe content. The balance 40% will account for intercalated waste. Fro manganese ore zone 25% of the ore is assumed to be recovered with > 20% Mn content while 10% of the ore is assumed to be recovered with >20% Mn content while 10% of the ore is assumed to be sub-grade having >10% to <20% Mn content. The balance 65% will account for intercalated waste. These figures have been taken based on the data of past mining activities.

AS PER THIS MODIFICATION TO THE APPROVED MINING PLAN:

The mining plan was approved for the year i.e. from 2006-07 to 2010-11. Now, first four years of the approved mining plan period have already been passed without any work and the fifth year is in progress. Mine is still under discontinuation due to want of forestry and environment clearance. Lessee has got stage-I forest clearance and final approval is under active consideration. On the other hand, lessee has got TOR from MOEF, New Delhi and EIA/EMP report is under preparation which requires some more data to be incorporated in the mining plan. As such, proposal for only one year i.e. for the fifth year (2010-11) is being chalked out and details are given hereunder.

For Iron Ore

The mining & Development activities have not been carried out during the year 2006-07 to 2009-10) due to forest constraints. As stated earlier, there is only one quarry for iron ore which contains mostly float iron ore, planning for the production of iron ore was envisaged from this quarry for the 5th year (2010-11) of the approved mining plan period.

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Development during Fifth year (2010 - 2011)

Description	Proposed Quarry - 1
Section Considered	MM' - NN'
R. L. of quarry floor at the end of year (m)	548.78
Length of influence (m)	81
Height / width of the bench (m/m)	6m/8m
Over all slope of quarry	45°

QUARRY - 1 (IRON ORE)

Section	mRL	Cros sectional Area (Sq.m)	Length of Influence (m)	Volume of Excavation (cum)	Recovery of iron ore (50% of the total excavation) (cum)	volume of Intercalated Waste (40% of the total excavation) (cum)	volume of sub-grade ore (10% of the total excavation) (cum)
MM'	565.66-559.66	101.81	81	8246.61	4123.30	3298.64	824.66
MM'	559.66-553.66	277.68	81	22492.08	11246.04	8996.83	2249.21
MM'	553.78-448.78	419.83	81	34006.23	17003.12	13602.49	3400.62
NN'	565.78-559.78	99.60	81	8067.60	4033.80	3227.04	806.76
NN'	559.78-553.78	416.57	81	33742.17	16871.10	13496.87	3374.22
NN'	553.78-448.78	351.18	81	28445.58	14222.79	11378.23	2844.56
				135000.30	67500.15	54000.12	13500.03

Summary :

Production of ore	=	202500 MT
Sub - grade	=	13500 m ³
Overburden	=	Nil
Intercalated waste	=	54000 m ³
Non-saleable materials	=	(13500 + 54000) m ³ = 67500 m ³
Stripping ration (t/m ³)	=	1:0.33

For Manganese Ore

The mining & Development activities have not been carried out during the year 2006-07 to 2009-10) due to forest constraints. As proposed in the approved mining plan, two quarries, i.e. quarry no. 4 and 7 have been proposed for the 5th and last year of the approved mining plan. The excavation to be carried out in the said two quarries has been given in details as below:

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Development during Fifth year (2010 - 2011)

Description	Proposed quarry-4	Proposed quarry-7
Section Considered	UU' and VV'	RR' and TT'
R. L. of quarry floor at the end of year (m)	647	648
Length of influence (m)	108	115
Height / width of the bench (m/m)	6/8	6/8
Over all slope of quarry	45°	45°

QUARRY - 4 (MANGANESE ORE)

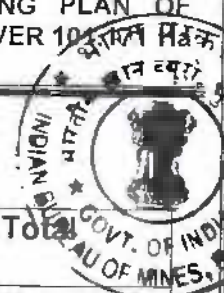
Section	mRL	Cros sectional Area (Sq.m)	Length of Influence (m)	Volume of Excavation (cum)	Recovery of Mn ore (25% of the total excavation) (cum)	volume of Intercalated Waste (65% of the total excavation) (cum)	volume of sub-grade ore (10% of the total excavation) (cum)
UU'	680.95-674.95	40.70	108	4395.60	1098.90	2857.14	439.56
	674.95-668.95	53.48	108	5775.84	1443.96	3754.30	577.58
	668.95-662.95	216.63	108	23396.04	5849.01	15207.43	2339.60
VV'	680.85-674.85	51.02	108	5510.16	1377.54	3581.60	551.02
	674.85-668.85	95.74	108	10339.92	2584.98	6720.95	1033.99
	668.85-662.85	143.93	108	15544.44	3886.11	10103.89	1554.44
Total				64962.00	16240.50	42225.31	6496.19

QUARRY - 7 (MANGANESE ORE)

Section	mRL	Cros sectional Area (Sq.m)	Length of Influence (m)	Volume of Excavation (cum)	Recovery of Mn ore (25% of the total excavation) (cum)	volume of Intercalated Waste (65% of the total excavation) (cum)	volume of sub-grade ore (10% of the total excavation) (cum)
RR'	677.62- 671.62	116.00	35	4060.00	1015.00	2639.00	406.00
	671.62 - 665.62	155.50	48	7464.00	1866.00	4851.60	746.40
	665.62-659.62	255.42	60	15300.00	3825.00	9945.00	1530.00
TT'	677.90- 671.90	27.30	75	2047.50	511.88	1330.88	204.75
	671.90 - 665.90	105.00	75	7875.00	1968.75	5118.75	787.50
	665.90-659.90	138.44	70	9690.50	2422.62	6298.82	969.05
Total				46437.00	11609.25	30184.05	4643.70

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Summary :

Description	P Q - 4	P Q 7	Total
Production of ore	16240.50 cum or 40602 MT	11609.25 cum or 29023 MT	69625 MT
Sub - grade	6496 cum	4644 cum	11140 cum
Overburden	Nil	Nil	Nil
Intercalated waste	42225 cum	30185 cum	72410 cum
Non-saleable materials	6496 + 42225 48721 cum	4644 + 30185 34829 cum	83550 cum
Stripping ration (t/m ³) Ore (t) : Non salable material (m ³)	1:1.20	1:1.20	1:1.20

4.2 Year wise Tonnage & grade of production expected

AS PER APPROVED MINING PLAN:

Year wise production of iron & manganese with waste (intercalated) and sub-grade are indicated in Table no. 8, 9, 10. However, the summarized figure of the above for both iron & manganese are given below:

(a) Iron (Proposed quarry - 1)

The production of ore, intercalated waste & sub-grade from the quarry is as follows:

Year	Production ore (MT)	Intercalated Waste (Cu.m)	Sub-grade generation (Cu.m)
1 st year (2006-07)	Nil	Nil	Nil
2 nd year (2007-08)	311850	83160	20790
3 rd year (2008-09)	170100	45360	11340
4 th year (2009-10)	174150	46440	11610
5 th year (2010-11)	202500	54000	13500
Total	858600	228960	57240

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Summary :

Production in 5 years	=	858600 MT
	=	286200 M ³
Non-saleable materials	=	228960 + 57240
(Intercalated waste + Sub-grade)	=	286200 M ³
Stripping Ration	=	1 : 0.33

(b) Manganese (Proposed quarry – 2 & 3)

Year	Production ore (MT)	Intercalated Waste (Cu.m)	Sub-grade generation (Cu.m)
1 st year (2006-07)	Nil	Nil	Nil
2 nd year (2007-08)	92625	96330	14820
3 rd year (2008-09)	61875	64350	9900
4 th year (2009-10)	65125	67730	10420
5 th year (2010-11)	69625	72410	11140
Total	289250	300820	46280

Summary :

Production in 5 years	=	289250 MT
	=	115700 M ³
Non-saleable materials	=	46280 + 300820
(Intercalated waste + Sub-grade)	=	347100 M ³
Stripping Ration	=	1 : 1.2

अनुमोदित
APPROVED
11/10/2010
क्षेत्रीय खान नियंत्रक
REGIONAL CONTROLLER OF MINES
भारतीय खान ब्यूरो
INDIAN BUREAU OF MINES
भुवनेश्वर/BHUBANESWAR

AS PER THIS MODIFICATION TO THE APPROVED MINING PLAN:

(a) Iron (Proposed quarry – 1)

The production of ore, intercalated waste & sub-grade from the quarry is as follows :

Year	Production ore (MT)	Intercalated Waste (Cu.m)	Sub-grade generation (Cu.m)
5 th year (2010-11)	202500	54000	13500
Total	202500	54000	13500

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Summary :

Production proposed during plan period (Only 5 th year is considered)	=	202500 MT
Non-saleable materials (Intercalated waste + Sub-grade)	=	(54000 + 13500) cum = 67500 cum
Stripping Ratio (t/cum)	=	1 : 0.33

(b) Manganese (Proposed quarry – 4 and 7)

Year	Production ore (MT)	Intercalated Waste (Cu.m)	Sub-grade Generation (Cu.m)
5 th year (2010-11)	69625	72410	11140
Total	69625	72410	11140

Summary :

Production proposed during plan period (Only 5 th year is considered)	=	69625 MT
Non-saleable materials (Intercalated waste + Sub-grade)	=	(72410 + 11140) cum = 83550 cum
Stripping Ratio (t/cum)	=	1 : 1.2

c) Attach composite plans and year wise sections (in case of 'B' Class Mine):

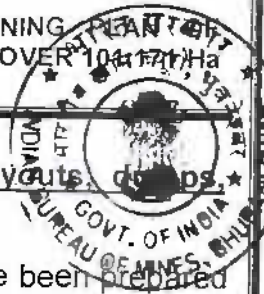
AS PER APPROVED MINING PLAN:

Year wise development plan & sections of pit layout for proposed quarries (1 for iron and 2 & 3 for manganese ore respectively) have been shown in Plates – IVA, IVB, IVC:

AS PER THIS MODIFICATION TO THE APPROVED MINING PLAN:

Development plan and sections both for iron and manganese sections have been prepared for the year 2010-11 and shown in development plan and sections. (Plate -6, 6A & 6B)

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d) Attach supporting composite plan and section showing pit layouts, dumps, stacks of sub-grade mineral, if any, etc.

Development plan and sections both for iron and manganese sections have been prepared for the year 2010-11 and shown in development plan and sections (Plate – 6, 6A & 6B).

e) Indicate proposed rate of production when the mine is fully developed, and the expected life of the mine and the year from which effected.

No change, Same as mentioned in the approved mining plan.

f) Attach a note furnishing a conceptual mining plan for the entire lease period based on the geological mining and environmental considerations.

AS PER APPROVED MINING PLAN:

a) **Iron Ore :**

As discussed earlier, the working of iron ore has been limited to one quarry only upto a depth of 20 m for surface level. The conceptual planning for iron ore has been projected around ore zone upto depth of 20 m from the surface level.

Mineable reserve estimated	18,80,625 MT
Production planned for five years	8,58,600 MT
Hence, reserve available for conceptual mining	$18,80,625 - 8,58,600$ $= 10,22,025 \text{ MT}$

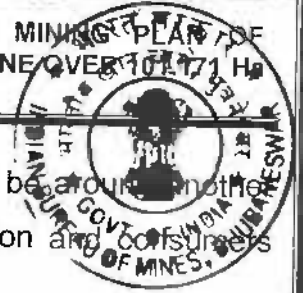
Keeping 2,00,000 Mt per year, the life of the mine will be around another 6 years.

b) **Manganese :**

As discussed earlier, the working of Manganese ore has been limited to one quarry only upto a depth of 10 mt for surface level. The conceptual planning for manganese has been projected around ore zone upto depth of 10 mt from the surface level.

Mineable reserve estimate	3106000 MT
Production planned for five years	289250 MT
Hence, reserve available for conceptual mining	$3106000 - 289250$ $= 2816750 \text{ MT}$

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Keeping production around 70000 Mt per year, the life of the mine will be around another 41 years. However this target may vary with the conceptual exploration and consumers demand and accordingly the life of the mine may vary.

AS PER THIS MODIFICATION TO THE APPROVED MINING PLAN:

Based on the reserve estimated as per UNFC classification and the production target proposed for the rest one year, the reserve available after this plan period and the life of the mine estimated is as follows:

a) Iron Ore:

Mineable reserve estimate	1449375 MT
Production planned for one year	202500 MT
Hence, reserve available for Conceptual mining	$(1449375 - 202500)$ MT = 10,22,025 MT

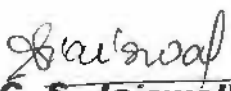
Keeping 2,00,000 Mt per year, the life of the mine will be around another 6 years.

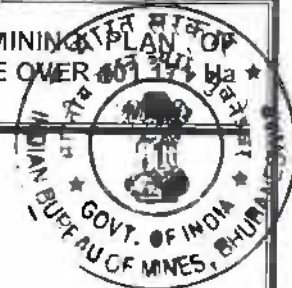
b) Manganese :

The mineable reserve for manganese zone has been calculated and production for the fifth year has been planned @ 69625 MT. The conceptual planning for manganese has been projected around ore zone upto depth of 10 m from the surface level.

Mineable reserve estimate	22,05,625 MT
Production planned for the fifth years	69625 MT
Hence, reserve available for conceptual mining	$(22,05,625 - 69625)$ MT = 21,36,000 MT

Keeping production around 70,000 MT per year, the life of the mine will be around another 30.5 years. However this target may vary with the conceptual exploration and consumers demand and accordingly the life of the mine may vary.


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Exploration Proposal

AS PER APPROVED MINING PLAN:

The exploration proposed during the conceptual period have been proposed around the ore zone to explore the depth ward continuity, the details of bore holes proposed are tabulated as below:

Iron Ore

No. of bore holes	Depth of bore hole	Meterage	Location
5	30	150	Ref. Plate – VIII

Manganese Ore

No. of bore holes	Depth of bore hole	Meterage	Location
10	30	300	Ref. Plate – VIII

AS PER THIS MODIFICATION TO THE APPROVED MINING PLAN:

As stated above, the first four years of the approved mining plan has already been passed and fifth year is in progress. The mining operation is still stopped in the area due to forest and environment clearance. But as the same is expected to be clear soon, lessee intends to start mining operation soon after getting the clearance. As such, the exploration proposed in the approved mining plan was not carried out. However, exploration has been proposed for the fifth year of this mining plan period. Further, 68 number of Boreholes have been proposed during the conceptual period is shown in Geological plan, marked as LBH.

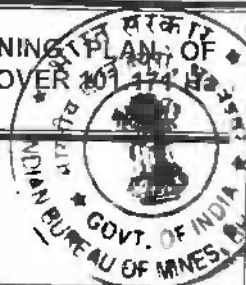
Land-use Pattern

AS PER APPROVED MINING PLAN:

During the life for the mine 86.399 hectares will be utilized for mining, storing of minerals dumping, etc. The detailed land use pattern is however as follows:

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**Table showing existing land use, land to be degraded
at the end of plan period and at ultimate stage.**

Sl. No.	Pattern of Utilization	Existing	Planned 5 years	At the end of 5 years	Beyond 5 years	Total
A	Mining	8.698	7.135	15.833	50.000	65.833
B	Dumping of overburden	5.620	3.500	9.120	4.000	13.120
C	Sub-grade storage	Nil	1.00	1.00	Nil	1.000
D	Construction of building power station, work shop, etc.	0.607	Nil	0.607	Nil	0.607
E	Township / housing colony	Nil	Nil	Nil	Nil	Nil
F	Construction of Road	1.539	0.20	1.739	0.200	1.939
G	Railway line etc, Magazine	Nil	Nil	Nil	Nil	Nil
H	Green Belt	Nil	1.650	1.650	2.250	3.900
	Grand Total	16.464	13.485	29.949	56.450	86.399

AS PER THIS MODIFICATION TO THE APPROVED MINING PLAN:

It has been stated earlier that first four years of the plan period have already been passed without any mining operation due to want of forest and environment clearance. As the forest and environment clearance are about to cleared, it has been anticipated that the mining operation will be resume soon. The land use for planned 5 years given in the approved mining plan was considered on the basis of plan period excavation and development.

Now, the same has been chalked out on the basis of only one year excavation. On the other hand, ultimate pit limit was established on the basis of proved, probable and possible zone in the approved mining plan. Here, the ultimate pit limit has been established on the basis of proved and probable reserve zone only. As such, there is a variation in proposed land use pattern at the end of plan period as well as at ultimate stage. The existing land use, land to be degraded at the end of plan period and at ultimate stage is given in table below:

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**Table showing existing land use, land to be degraded
at the end of plan period and at ultimate stage.**

Sl. No.	Pattern of Utilization	Existing	At the end of plan period	At ultimate stage
A	Mining	8.698	12.218	28.590 – (10.63 ha area will be backfilled and planted. Rest 17.96 ha will be rehabilitated by plantation).
B	Dumping of overburden	5.620	9.120	13.120 – (Total waste material shall be utilized for backfilling and the area shall be rehabilitated by plantation)
C	Sub-grade storage	Nil	1.00	1.000 – (The area shall be rehabilitated by plantation).
D	Construction of building power station, work shop, etc.	0.607	0.607	0.607- (shall be handed over to forest authority or dismantled and planted).
E	Township / housing colony	Nil	Nil	Nil
F	Construction of Road	1.539	1.739	1.939 (shall be utilized by the forest authority).
G	Railway line etc, Magazine	Nil	Nil	Nil
H	Green Belt	Nil	0.410	3.900 (Development of green belt).
	Grand Total	16.464	25.094	49.156

Ultimate extent and size of the pit :

AS PER APPROVED MINING PLAN:

a) Iron

The conceptual iron quarry has been projected up to a depth of around 20 mts from surface level matching with the possible limit of the ore zone. The conceptual mining has been projected by extending the quarry in all the directions. The ultimate extent and size of the pit will be of the average dimension (length x breadth x depth) 320m x 180m x 20m.

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b) Manganese

An envisage, the conceptual manganese quarry has been projected upto a depth of around 10m from the surface matching with the possible limit of the ore zone. The conceptual mining has been projected by extending the quarry in all the directions. The ultimate extent and size of the pit will be of the average dimension (length x breadth x height) 1000m x 500m x 10m.

AS PER THIS MODIFICATION TO THE APPROVED MINING PLAN:

In this modification to the approved mining plan, ultimate pit limit has been established by considering the proved and probable reserve zone. As such, at ultimate stage, about 8.13 ha area shall be degrade due to excavation in iron ore zone whereas about 20.46 ha area shall come under excavation at ultimate stage in manganese ore zone.

Final slope angle at the close of mine :

AS PER APPROVED MINING PLAN:

The final slope angle would be kept at 45° with the erection of quarry bench of 5m height and width, in case of iron ore and 3m height & width in case of manganese (Ref. Plat VIII (A)).

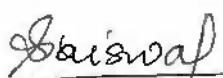
AS PER THIS MODIFICATION TO THE APPROVED MINING PLAN:

The final slope angle would be kept at 45° with the erection of quarry bench of 6m height and width.

Ultimate pit limit boundaries :

AS PER APPROVED MINING PLAN:

The possible limit of both iron & manganese quarry with their corresponding sections have been indicated in Plate : VIII & VIIIA. However, these boundaries have been arbitrarily fixed & this will change with conceptual exploration and increase and decrease of production level as per the consumer's demand.


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AS PER THIS MODIFICATION TO THE APPROVED MINING PLAN:

The ultimate pit limit of both iron & manganese quarry with their corresponding sections have been indicated in Plate 8 and 9. However, these boundaries have been fixed on the basis of present available proved and probable mineralized zone & this will change with conceptual exploration.

Ultimate capacity of dump :

AS PER APPROVED MINING PLAN:

The waste during conceptual period will be generated of 17640 m³ & 3756155 m³ of waste from iron and manganese ore zone respectively. Out of the waste from the iron and manganese ore zone, 50% will be disposed in the mined out area and 30% will be used for road maintenance. Remaining 20% of waste will be disposed in the Block – B3 & Block – C covering an area of 40000m².

Waste materials likely to be generated	-	8,14,759 m ³
Average height of the dump	=	20 m
Surfacial area	=	40000 m ²
No. of Terrace	=	2 nos
Terrace height	-	10m each

Parameters	Iron Ore Section	Manganese Ore section
Mineable Reserve	1880625 MT	3106000 MT
Excavation proposed for 5 years	858600 MT	289250 MT
Remaining mineable reserve	(1880625 – 858600) = 1022025 MT	(3106000 – 289250) MT
Total volume of mineable zone	681350 cum	4506800 cum
Waste generation	681350 x 0.40 = 272540 cum	4506800 x 0.65 = 2929420 cum
Sub-grade generation	68135 cum	4506800 x 0.10 = 450680 cum
Total non-saleable material	(272540 + 68135) cum = 340675 cum	(2929420 + 450680) = 3380100 cum
Stripping ratio	1 : 0.33	1 : 1.2

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AS PER THIS MODIFICATION TO THE APPROVED MINING PLAN:

The waste to be generated during conceptual period from iron ore and manganese ore section has been chalked out and given below:

Iron sector

Block No.	Total Excavation	Intercalated Waste(40%)
G	2361765.00	944706.00
Total	2361765.00	944706.00

Manganese sector

Block No.	Total Excavation	Intercalated Waste(65%)
A	248675.00	161638.75
B	1771527.00	1151492.55
C	591216.00	384290.40
D	727260.00	472719.00
E	394749.00	256586.85
F	163704.00	106407.60
Total	3897131.00	2533135.15

Thus, waste to be generated up to conceptual period will be to the tune of 34,77,840 cum from iron and manganese ore zone. On the other hand, about 28.59 ha mined out area will be available for its reclamation by backfilling. So, it is proposed to utilize this waste material for the reclamation of mined out area at ultimate stage. It is calculated that the available waste shall cover about 10.63 ha of the mined out area.

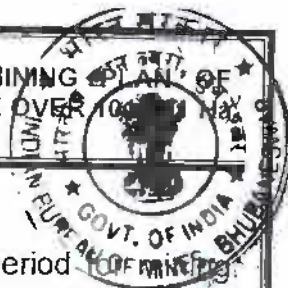
Reclamation & Rehabilitation measures:

AS PER APPROVED MINING PLAN:

As the existing quarries or part thereof has not been fully exhausted, no reclamation programme has been felt at present. However, owing to certain land degradation, afforestation programme during the proposed mining period has been suggested along the lease boundary to restore the eco-balance and also to increase the greenery of the M. L. area. During the life of the mine 86.399 hectares will be subjected for mining, dumping, etc. The above area will be progressively reclaimed and rehabilitated depending upon the availability of the exhausted quarry or part thereof.

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Quarry Area (Conceptual Period)

A total of 65.833 hectares of land will be degraded during conceptual period

Details of the location, area & types of reclamation / rehabilitation measures have been given below :

Name of the quarry	Period of Reclamation & Rehabilitation Measures	Location	Area (hects)	Type of Reclamation & Rehabilitation Measures
Manganese & Iron	During Conceptual period	Total mined out area	65.833	Back filling & Plantation

Dump Area

A total of 13.120 hectares of land will be degraded during conceptual period for dumping.

Details of the location, area & types of reclamation / rehabilitation measures have been given below :

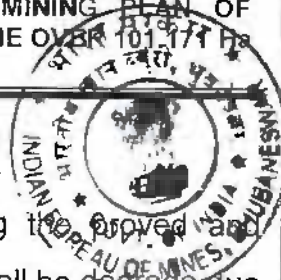
Name of the quarry	Period of Reclamation & Rehabilitation Measures	Location	Area (hects)	Type of Reclamation & Rehabilitation Measures
Manganese & Iron	During Conceptual period	(Ref. Plate - VIII)	13.120	Plantation

Post mining land use at the end of life of the mine is presented as following table.

Sl. No.	Pattern of Utilization	Total
A	Mining	65.833
B	Dumping of overburden	13.120
C	Sub-grade storage	1.000
D	Construction of building power station, work shop, etc.	0.607
E	Construction of Road	1.939
F	Green Belt	3.900
	Grand Total	86.399

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AS PER THIS MODIFICATION TO THE APPROVED MINING PLAN:

As stated earlier, ultimate pit limit has been established considering the approved and probable reserve zone. As such, at ultimate stage, about 8.13 ha area shall be degraded due to excavation in iron ore zone whereas about 20.46 ha area shall come under excavation at ultimate stage in manganese ore zone. So, total 28.59 ha mined out area will be available for its reclamation by backfilling.

On the other hand, about 34,77,840 cum waste will be generated up to conceptual period from iron and manganese ore zone. So, it is proposed to utilize this waste material for the reclamation of mined out area at ultimate stage. It is calculated that the available waste shall cover about 10.63 ha of the mined out area. The area so reclaimed at ultimate stage shall be rehabilitated by plantation. Rest 17.96 ha of mined out area shall be rehabilitated by plantation. At ultimate stage, there will be no surface dump and the area covered under waste, sub-grade etc shall be rehabilitated by plantation.

At the ultimate stage, reclamation and post mining land use pattern of the area shall emerge as follows:-

- i) Total 28.59 ha area shall be degraded at ultimate stage due to excavation.
- ii) Reclamation of 10.63 hectares mined out area by backfilling of waste material and rehabilitation by plantation.
- iii) Reclamation of 17.96 ha area by means of stabilizing the dead benches and rehabilitation by plantation.
- iv) Massive plantation shall be done in different locations as shown in Conceptual Plan (Plate - 8).
- v) Infrastructure - office etc shall be handed over to the forest authority for community use after negotiation.
- vi) At ultimate stage, there will be no waste dump as the entire waste material of the dumps will be utilized for the reclamation of void created by pits, by backfilling.
- vii) The entire degraded area shall be reclaimed and rehabilitated at ultimate stage and handed over to the forest authority.

The existing and proposed land use pattern is given below:

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Existing & proposed Land-Use.

(Figures are in Hectare)

Sl. No.	Pattern of Utilization	Existing	At the end of plan period	At ultimate stage
A	Mining	8.698	12.218	28.590 – (10.63 ha area will be backfilled and planted. Rest 17.96 ha will be rehabilitated by plantation).
B	Dumping of overburden	5.620	9.120	13.120 – (Total waste material shall be utilized for backfilling and the area shall be rehabilitated by plantation)
C	Sub-grade storage	Nil	1.00	1.000 – (The area shall be rehabilitated by plantation).
D	Construction of building power station, work shop, etc.	0.607	0.607	0.607- (shall be handed over to forest authority or dismantled and planted).
E	Township / housing colony	Nil	Nil	Nil
F	Construction of Road	1.539	1.739	1.939 (shall be utilized by the forest authority).
G	Railway line etc, Magazine	Nil	Nil	Nil
H	Green Belt	Nil	0.410	3.900 (Development of green belt).
	Grand Total	16.464	25.094	49.156

In that way, the whole degraded area shall be rehabilitated and finally handed over to the forest authority.

Safety & Environmental Measures :

AS PER APPROVED MINING PLAN:

- Comprehensive post plantations are is to be undertaken
- Schedule of monitoring for ambient air, noise, dust and water are to be regulated properly.
- Proper maintenance of the road surface will be done by spraying water periodically.
- Muffle blasting will be adopted so as to reduce flyrock movement.
- Proper manuring and watering at the plantation site will be supervised to achieve 80% survival of planted saplings.

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Same, as mentioned in the approved mining plan.

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g) Opencast mines

i) Describe briefly giving salient features of the mode of working (mechanized, mechanised, manual)

Same as mentioned in the approved mining plan.

ii) Describe briefly the layout of mine working, the layout of faces and sites for disposal of overburden/waste. A reference to the plans enclosed under 4(b) and 4(d) will suffice:

AS PER APPROVED MINING PLAN:

Geometry of Benches :

	Iron	Manganese
Height of benches	5m	3m
Width of benches	5m	3m
Bench slope	90°	90°
Overall pit slope	45°	45°

Haulage Design

Haul roads will be provided at 1:16 to 1:20 gradient. Width of the roads will be maintained at 6 to 8 m.

Drain Design :

Peripheral / garland drains with settling tanks will be provided around the waste dump. Width and depth of the drain will be 2m and 1m respectively. Slope will be within 1:30 to 1:50.

AS PER THIS MODIFICATION TO THE APPROVED MINING PLAN:

Geometry of Benches :

	Iron	Manganese
Height of benches	6m	6m
Width of benches	8m	8m
Bench slope	90°	90°
Overall pit slope	37°	37°

The haulage and drain design will be same as proposed in the approved mining plan.

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h) Underground Mines:

Not applicable

i) Extent of Mechanization:

Describe briefly including the calculation for adequacy and type of machinery and equipment proposed to be used in different mining operations.

1) Drilling :-

No Change. Same as mentioned in the approved mining plan.

2) Loading Equipments:-

No Change. Same as mentioned in the approved mining plan.

3) Haulage and Transport Equipments :-

No Change. Same as mentioned in the approved mining plan.

J) Miscellaneous:

Describe briefly and allied operations and machineries related to the mining of the deposit not covered earlier:

No Change. Same as mentioned in the approved mining plan.


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5. BLASTING

Describe briefly:

a) Broad blasting parameters like charge per hole, blasting pattern, charge per delay, maximum number of holes blasted in a round, manner and sequence of firing, etc.

As per approved mining plan:

Shallow hole blasting will be carried on to dislodge the boulders. Proper charging stemming & muffle blasting has been proposed against fly rock hazards while preventive measures like marking of danger zone, arrangement of warning signals by hooting are proposed to be done.

Broad Blasting Parameters :

Average depth of the blast Holes	2.5 m
Burden	1.2m
Spacing	1.5 m
Diameter of the hole	85mm
Diameter of the cartridge	80mm
Powder factor of the explosive	2.15Cu.m / kg
Length of the explosive cartridge	Depending upon the blast hole design & nature of the strata
Volume yield per hole	Burden x Spacing x Depth of hole $1.2 \times 1.5 \times 2.5 = 4.5 \text{ Cu.m}$

As per modification to the approved mining plan:

No Change. Same as proposed in the approved mining plan.

b) Type of explosive used/to be used:

As per approved mining plan:

To carryout blasting operation, Class – III (Special gelatine 80% strength) and Class – VI explosive (detonator and safety fuse of standard length) will be utilized in the mine.

As per modification to the approved mining plan:

No Change. Same as proposed in the approved mining plan.

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c) Power factor in ore and overburden/waste/development heading/stopes

As per approved mining plan:

Powder factor of the explosive	=	2.15 M ³ /kg
Average daily production of ore from blast hole	=	675 m ³
Total quantity of explosives required / day	=	675/4.50 = 150 kg
Explosive for jack-hammers / holes	=	10 kg approx
Total explosive consumption per day	=	150 + 10 = 160 kg.

As per modification to the approved mining plan:

No Change. Same as proposed in the approved mining plan.

d) Whether secondary blasting is needed, if so describe in brief:

Not applicable.

e) Storage of explosives (like capacity and type of explosive magazine):

As per approved mining plan:

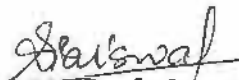
For secure & safe storage of explosive a permanent magazine is proposed to be installed in the M.L. area. To this effect NOC has been obtained from the appropriate authorities. The proposed magazine site has been chosen on the NE corner of the lease-hold area (Plate – II & VII). The capacity of the magazine is as follows :

Class	Commercial recognition	Amount
Class – III	Special gelatine 80% strength	200 kg
Class – VI	Safety fuse	100 coils
Class – VI	Detonators	1000 nos.

Apart from the above, a set of carrying box consisting of two boxes one for carrying 5 kg. of explosives and the other for carrying 200 nos. of detonators, and approved by the safety authorities, shall be provided for carrying explosive from the magazine to blasting site.

As per modification to the approved mining plan:

No Change. Same as proposed in the approved mining plan.


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6.0 MINE DRAINAGE

As per approved mining plan:

A seasonal Naia, which flows in the close vicinity of the existing quarry and just outside the lease area, forms the main drainage of the area. This nala being a perennial one, carried the surface run-off during monsoon months.

As observed the proposed working has been projected on hill slopes, the surface run-off during the monsoons would not be accumulated in the quarry. The surface run-off as discussed will be carried through seasonal drain posing no drainage problem.

As per modification to the approved mining plan:

No change. Same as mentioned in the approved mining plan.

a) Likely depth of water table based on observations from nearby wells and water bodies.

As per approved mining plan:

The ground water table is expected to be at more than 30m depth from surface level.

As per modification to the approved mining plan:

No change. Same as mentioned in the approved mining plan.

b) Workings expected to be.....m above/reach below water table by the year.....

As per approved mining plan:

The deposit is planned to be operated up to a maximum depth of 20m from surface level. Hence, the aforesaid depth of working would not affect the ground water table.

As per modification to the approved mining plan:

No change. Same as mentioned in the approved mining plan.

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c) Quantity and quality of water likely to be encountered, the pumping arrangements and places where the mine water is finally proposed to be discharged.

As per approved mining plan:

Mining will not be done near the nala and the ground water table of the region will be much below the proposed quarry floor. So there will be no problem of seepage / ground water accumulation in the mine requiring pumping and drainage.

Quality of rain water passing through the proposed mine and its management.

Rain water in the mining area may be polluted due to the

- a) Reaction with air pollutants
- b) Wash-offs with suspended particles or toxic materials

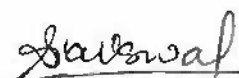
There is no industry within 5 km radius of the applied M.L. area. Therefore water pollution due to air pollutants & leakage will be negligible. The only source of pollution will be wash-offs. However, a check dam will be constructed in first & second years along the toe of the hill and maintained subsequently to arrest the suspended particles which will be coming out during mining.

Method of rain water management :

Drainage system of the area is controlled by the Kundru nalla which flows in the western side of the area at a distance of 1 km from the lease area. Three to four seasonal nalla passes in the lease area along south to north boundary to meet main nalla. The manner of disposal of drain water from the quarry & dump area has been depreciated in the environment management plan through garland drain via settling tank.

As per modification to the approved mining plan:

No change. Same as mentioned in the approved mining plan.


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7.0 DISPOSAL OF WASTE AND STACKING OF SUB-GRADE ORE

a) Indicate briefly the nature and quantity of top soil, overburden/waste and mineral rejects likely to be generated during the next five years.

As per approved mining plan:

Iron ore is mixed with Ferruginous laterite and the manganese ore is mineralized with laterite, hence laterite is the main waste to be generated during mining operation. However the quantity of intercalated waste, sub-grade to be generated during five years of plan period are as follows :

Iron

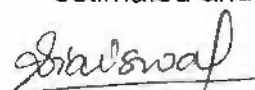
Year	Intercalated Waste (m ³)	Sub-grade (m ³)	Total (m ³)
2 nd year (2007-08)	83160	20790	103950
3 rd year (2008-09)	45360	11340	56700
4 th year (2009-10)	46440	11610	58050
5 th year (2010-11)	54000	13500	67500
Total	228960	57240	286200

Manganese

Year	Intercalated Waste (m ³)	Sub-grade (m ³)	Total (m ³)
2 nd year (2007-08)	96260	14820	111080
3 rd year (2008-09)	64350	9900	74250
4 th year (2009-10)	67730	10420	78150
5 th year (2010-11)	72410	11140	83550
Total	300750	46280	347030

As per modification to the approved mining plan:

As stated earlier, first four years of approved mining plan have already been passed without any mining operation. So, only one year i.e. 5th year (2010-2011) is left for which planning has been made. The nature of waste is same as mentioned in the approved mining plan. Hence, based on the excavation, quantity of intercalated waste, sub-grade to be generated during the rest one year of the approved plan period has been estimated and given in table below:


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Iron

Year	Intercalated Waste (m ³)	Sub-grade (m ³)	Total (m ³)
2 nd year (2007-08)	No work		-
3 rd year (2008-09)	No work		-
4 th year (2009-10)	No work		-
5 th year (2010-11)	54000	13500	67500
Total	54000	13500	67500

Manganese

Year	Intercalated Waste (m ³)	Sub-grade (m ³)	Total (m ³)
2 nd year (2007-08)	No work		-
3 rd year (2008-09)	No work		-
4 th year (2009-10)	No work		-
5 th year (2010-11)	72410	11140	83550
Total	72410	11140	83550

b) Land chosen for disposal of waste with proper justification:

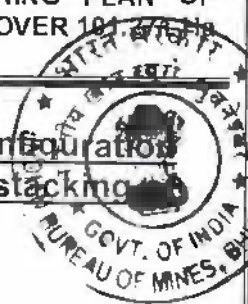
As per approved mining plan:

For convenience of operation and looking to barren nature of ground the dumping yard is selected outside the pit limit. The waste generated from proposed iron quarry will be dumped on western side of shale patch as indicated in plant no. viii & the waste generated from proposed manganese quarries will be dumped on western side of Block – B. The dumps (PD – 1 & PD – 2) will be able to hold the generation of waste during 5 years of planned period. To confirm the barrenness of the proposed dumping area four numbers of DBH holes i.e., DBH₁₋₁₀ & DBH₁₁₋₂₀ are proposed to be done. Proposed dump – 1 for manganese and proposed dump – 2 for iron.

As per modification to the approved mining plan:

As mentioned in the approved mining plan, the waste generated from proposed iron quarry will be dumped on western side of shale patch (Dump – 2) as indicated in plate -8 & the waste from proposed manganese quarries will be dumped on western side of Block – B (Dump-1). The dumps (PD – 1 & PD – 2) is sufficient to accommodate the waste to be generated during the year 2010-11.

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c) Attach a note indicating the manner of disposal and configuration sequence of build up of dumps along with the proposals for the stacking of sub grade ore to be indicated item wise:

As per approved mining plan:

Proposed Dump -1 (Manganese)

Waste materials likely to be generated	=	300750 m ³
Average height of the dump proposed	=	15m
Surfacial area required	=	20000 m ²

Proposed Dump -2(Iron)

Waste materials likely to be generated	=	228960 m ³
Average height of the dump proposed	=	15.26m
Surfacial area required	=	15000 m ²

Stacking of Sub-grade Ore :

a) Iron

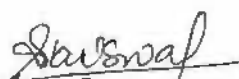
Keeping at par with the marked demand, iron ore containing above 63% Fe is considered as marketable & the ore ranging between 55% Fe to <58% Fe have been accounted for sub-grade ore. The total generation of sub-grade ore will be 5720 m³.

b) Manganese

The cutoff grade of manganese ore reserve has been found as 20%. The total generation of sub-grade is computed to be 46280 m³

Selection of Site for Sub-grade Stacking :

Two sub-grade stacking sites have been proposed (Ref. Plate – VII) (for both iron and manganese) & this stacking site would be of temporary in nature as these are required to be marketed as per demand after being blended with high grade ores.


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Height & Spread of Sub-grade Stack :

Manganese

Likely generation of sub-grade from proposed manganese quarry during 5 year = 46280 m³

Average height of the stack proposed = 9m

Spreading area required = 5000 m²

Iron

Likely generation of sub-grade from proposed Iron quarry during 5 year = 57240 m³

Average height of the stack proposed = 11m

Spreading area required = 5000 m²

As per modification to the approved mining plan:

Waste dump:

Proposed Dump -1 (Manganese)

Waste materials likely to be generated = 76935.62 m³ (Loose)

Average height of the dump proposed = 3.85 m

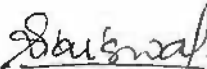
Surfacial area required = 20000 m²

Proposed Dump -2(Iron)

Waste materials likely to be generated = 57375 m³ (Loose)

Average height of the dump proposed = 3.83 m

Surfacial area required = 15000 m²


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Stacking of Sub-grade Ore :

a) Iron


Keeping at par with the marked demand, iron ore containing above 57% Fe is considered as marketable & the ore ranging between 45% Fe to <57% Fe have been accounted for sub-grade ore. The total generation of sub-grade ore will be 13500 m³.

b) Manganese

The cutoff grade of manganese ore reserve has been found as 20%. The total generation of sub-grade is computed to be 11140 m³

Selection of Site for Sub-grade Stacking :

Same as mentioned in the approved mining plan.


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8.0 USE OF MINERAL

a) Describe briefly the end use of the mineral (sale to intermediary parties, captive consumption, export, industrial use).

The lessee has no such captive use of the ore raised from the M.L. area.

b) Indicate physical and chemical specifications stipulated by buyers:

The marketable ore raised from the mine is being consumed by different industries. The detailed specification of ore being supplied to these industries are as follows:

SPECIFICATION OF IRON ORE WITH RESPECT TO CONSUMING INDUSTRIES

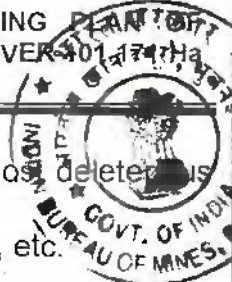
Iron Ore Constituents	Blast Furnace	Steel Plan	Sponge Iron Grade
Fe	60 – 67%	62 – 68%	65 – 67%
SiO ₂	2 – 3%	2 – 3%	2% max
Al ₂ O ₃	3 – 6%	2 – 3%	3% max
SiO ₂ + Al ₂ O ₃	Nil	Nil	5% max
Al ₂ O ₃ / SiO ₂	1 : 6 max	Nil	1.6 max
P	0.15% max	0.03 – 0.1	0.05% max
S	0.03% max	Nil	0.02% max
Cu	0.03% max	Nil	0.04% max
Pb & Others	Nil	Nil	Traces
Size	10mm to 15mm	50 – 150mm	5 to 18mm

SPECIFICATION OF MANGANESE ORE WITH RESPECT TO CONSUMING INDUSTRIES

Specification	Ferro Manganese	Blast Furnace	Dry Battery	Chemical Industry	Glass Industry
Mn %	46 - 48%	25% min	+72%	+75%	+80%
Silica %	9% max	8% max	Nil	6% max	2.8% max
Alumina %	3% max	8% max	Nil	Nil	1.1% max
Iron %	8% max	18 - 24%	Nil	1.5% max	5% max
Phosphorus%	01.6%	0.18% max	Nil	Nil	Nil
Moisture	3% max	3% max	3% max	3% max	Nil
Size	10mm to 40mm	10mm to 40mm	10mm to 40mm	Nil	Nil

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- * For manufacture of ferromanganese phosphorous and sulphur are most deleterious constituents
- * For battery industry, the ore should be free from copper, nickel, cobalt, etc.

c) Give details in case blending of different grades of ores is being practiced or is to be practiced at the mine to meet specifications stipulated by buyers:

The sub-grade material generated during the course of mining operation shall be blended with high grade ore to make it marketable.

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9.0 OTHER INFORMATION :

a) Site Services:

As per approved mining plan :

As observed one office cum-rest shed is existing in the ML area & being of temporary nature has been broken away. However, it is proposed to construct statutory and essential infrastructure like rest shed, blasting shed, first-aid center, crèche canteen and drinking water facilities will be provided in the lease area.

As per modification to the approved mining plan:

At present, there is no office or any other infrastructure, as the office-cum-rest shelter was of temporary nature and broken away, as the mining work is suspended since long. However, as mentioned in the approved mining plan, it is proposed to construct statutory and essential infrastructure like rest shed, blasting shed, first-aid center, crèche canteen etc and drinking water facilities will be provided in the lease area.

b) Employment Potential:

As per approved mining plan :

For Iron :

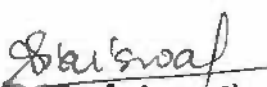
Average production per year as projected = 200000 MT

Assuming 25% production to be done manually, i.e., = 50000 Mt

Number of working days = 300

Daily production = 50000 / 300
= 166.66 MT

Taking OMS 1.5 MT about 111 labourers will be employed at the proposed working site. Considering absenteeism at 10%, the total number of labourers at the mine site would be about 122 numbers.


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For Manganese :

Average production per year as projected	=	70000 MT
Assuming 25% production to be done manually, i.e.,	=	17500 MT
Number of working days	=	300
Daily production	=	17500 / 300
	=	58.33 MT

Taking OMS 0.77 MT about 76 labourers are required to be employed in order to achieve the proposed production target. Considering absenteeism at 10%, the total number of labourers will be around 84. Hence, the total labourers to be employed are estimated to be (122 + 84) = 206 nos.

Requirement of Management & Supervisory Personnel's.

Sl. No.	Post	Qualification / Experience	Numbers
1	Mines Manager	Mines Manager's Certificate of Competency	1
2	Mining Engineer	Degree in Mining Engineering	1
3	Geologist	M.Sc. in Geology	Part time
4	Foreman	Foreman's Certificate of Competency	1
5	Supervisor / Mining Mates	---	3
6	Office Assistants	---	3
7	Driller-cum-compressor operator	Experience in drilling in iron ore mines	5
8	Blaster	Blasters certificate of competence	2
	Total		16

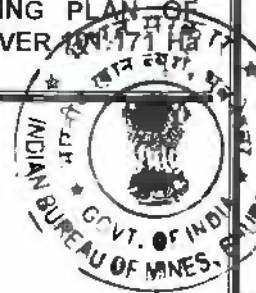
Requirement of Labourers (Skilled / Semi-skilled / Un – skilled)

Sl. No.	Type	Percentage Proposed	Numbers
1	Skilled Labour	25%	52
2	Semi – skilled Labour	35%	72
3	Un – skilled Labour	40%	82
Total			206

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No change. Same as mentioned in the approved mining plan.

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10.0 MINERAL BENEFICIATION :

As per approved mining plan:

- 10.1 The ore raised from the mines require sizing, dressing, sorting / screening, blending etc prior to dispatch.
- 10.2 Beneficiation process will yield 10-15mm, 50-150mm and 5-18mm as lumps and - 5mm a fines.
- 10.3 The average grade of the iron & manganese ore is observed to be 62.90% and 45.97% . The cut-off being fixed as <58% Fe & <20% Mn. The generation for sub-grade material is comparatively low at around 20% and the quantity after sorting & sizing & screening etc., can be kept for blending in future with high grade ores as and when required. Hence, stacking of sub-grade materials has been felt temporary since these ores can be marketed after blending with high grade ores.

As per modification to the approved mining plan:

- 10.1 No change. Same as mentioned in the approved mining plan.
- 10.2 No change. Same as mentioned in the approved mining plan.
- 10.3 The average grade of the iron & manganese ore is observed to be 62.90% and 45.97% respectively. The cut-off grade fixed as 57% Fe for iron ore whereas 20% Mn for manganese ore. The generation for sub-grade material is comparatively low at around 10% and the quantity after sorting & sizing & screening etc., can be kept for blending in future with high grade ores as and when required. Hence, stacking of sub-grade materials has been felt temporary since these ores can be marketed after blending with high grade ores.

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11.0 ENVIRONMENT MANAGEMENT PLAN

a) Attach a note on the status of base line information with regard to the following:

AS PER APPROVED MINING PLAN

i) Existing land use pattern indicating the area already degraded due to quarrying/pitting, dumping, roads, processing plant workshop, township etc. in a tabular form:

Existing Land – use Pattern

Sl. No.	Pattern of Utilization	Area in hectares
1	Mining	8.698
2	Storing of minerals / ore	Nil
3	Dumping of overburden	5.620
4	Construction of building, power station, workshop, etc.	0.607
5	Construction of road, railway line, etc	1.539
6	Township / housing colony	Nil
	TOTAL	16.464

ii) Water Regime:

There is no seasonal nala in the lease hold area. There exist tube wells and dug wells in nearby village, which serve as the source of drinking water for the staff of mines and villagers. So far as the water quality is concerned for the use by the villagers / workers, it is found to be potable.

iii) Flora & Fauna:

Flora : The general character of the vegetation is tropical dry deciduous type and the density of forest cover in the core zone is found to be low.

* Trees

The existing trees observed in the core & buffer zone of M.L. area are as follows :

- | | | | |
|------|-----------|---|--------------------------|
| i) | Mahul | - | Madhuca indica |
| ii) | Mango | ☉ | Mangifera indica |
| iii) | Jackfruit | ☉ | Artocarpus heterophyllus |
| iv) | Awala | ☉ | Ahlayanthous emplica |
| v) | Neem | ☉ | Azadirachta indica |

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* Shrubs

The varieties of shrubs and bushes existing in the area are shown below :

- | | | | |
|-----|--------------|---|--------------------|
| i) | Tulasi | - | ocimum somctum |
| ii) | Indian Plums | - | Ziaplans cenoplica |

* Grass

The common varieties of grass observed in this area are as follows :

- | | | | |
|-----|-------------|---|------------------|
| i) | Mutha grass | - | Cyperus rotundus |
| ii) | Stapt grass | - | Poa eno suroids |

Fauna : Fauna in the surrounded area are wild animals and birds. There is no endangered species of fauna in the M. L. area. The leasehold area does not represent the migratory path of bird(s) and / or animal(s).

- | | |
|------------------|---|
| * Wild animals : | Rabbits, Wild pigs, Monkeys, Jackals |
| * Bird Species : | Doves, Parrots, Wild fowls, Pigeons, etc. |

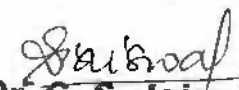
iv) Quality of Air, ambient noise level and water:

A summarized statement of air, water and noise monitoring in core and buffer zone of the M. L. area reveals as follows:

- Predominant wind direction was NNE
- Calm period was 46.74%
- SPM was within the range of 150 to 250 mcg/m³
- SO₂ was within 1.20 to 3.10 mcg/m³
- NO_x was within 3.5 to 7.3 mcg/m³
- CO was below 1.0 PPM
- Noise levels were within 70 dB(A)
- Dust fall was within 2.1 to 6.7 tonnes / sq. km / month
- Drinking water and well water were having pH 6.9. Total dissolved solids were 117.8 mg/l. Other parameters such as Cl, SO₄, BOD, COD, etc were below the permissible limit.

v) Climatic Condition:

The nearest location where the records of rainfall, temperature data are available, with respect to the M.L. area is Koira block, district Sundergarh. The annual average rainfall over a 10 years period has been 1374 mm and December is the coldest month. The data on relative humidity generated during April 2001 to February 2002 is varying from 18% to 95%.


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vi) Human Settlement:

Population density	134 per Sq. Km for Keonjhar district
Decennial Population growth	+16.65 for Keonjhar district
Employment & Literacy	A socio-economic for demographic profile of villages within 10 km radius of the project site appended in table 14, 15, 16.
Human settlements in the M.L. area	The lease hold is devoid of any human settlements.

vii) Public buildings, places of worship & monuments:

There are no public buildings, places of worship or monuments within 5 km radius of the M. L. area.

viii) Does the area (partly or fully) fall under notified area under water (prevention & control of pollution) Act 1974.

(Prevention & Control of Pollution) Act 1974. The area is not coming under water (Prevention & Control of Pollution) Act 1974.

Location of Sampling Station :

Air, water and noise monitoring is proposed to be done through out the life of the mine. Parameters are to be examined as per India Standards. The location of the monitoring stations are earmarked in key plan.

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No Change. Same as mentioned in the approved mining plan.

b) Attach an Environmental Impact Assessment Statement describing the impact of mining and beneficiation on environment on the following over the next five years.

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i) Land area indicating the area likely to be degraded due to quarrying/pitting, dumping, roads, workshop processing plant, township etc.

An area of 16.464 hectares is already degraded due to mining and exploration. During ensuing five years for mining and allied activities except 16.464 hectares another 11.835 hectares will be utilized. The details are tabulated as follows :

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Sl. No.	Pattern of Utilization	Existing	Planned 5 years	
a)	Mining	8.698	7.135	15.833
b)	Storing of minerals / ore	Nil	1.000	1.000
c)	Dumping of overburden	5.620	3.500	9.120
d)	Storing of tools & machines	Nil	Nil	Nil
e)	Construction of building power station, work shop, etc.	0.607	Nil	0.607
f)	Township / housing colony	Nil	Nil	Nil
g)	Construction of Road, railway line, etc.	1.539	0.20	1.739
	Grand Total	16.464	11.835	28.299

ii) Impact on Air Quality:

Method of mining will be semi-mechanized with the deployment of wagon jack-hammer drills, compressor and tippers. Further the rate of excavation is going to be increased and as such there will be some amount of dust generation during excavation, loading and movement of trucks.

iii) Impact on Water Quality:

Drinking water source for the area is tube well. Perennial Suna nadi located in the western side of the lease area serves the domestic need of the area. There is no possibility of generation of toxic materials which may pollute water quality. However, there may be impact on water quality due to flow of sediments mostly during rainy season.

iv) Impact on Noise Levels :

Sources of the noise in the mine will be jack hammer drill, compressor and truck / tippers. There will be little change in noise level because of production level. The expected noise level in the close vicinity of the above machinery will be around 90 dB (A).

v) Vibration Levels (due to blasting):

There is no human settlement within the lease area. However, vibration levels are proposed to be studied and maintained accordingly by changing the blasting parameters such as burden, spacing, depth of the hole and specific charge.

vi) Socio-economics :

It is a fact that iron ore deposits of Singhbhum-Keonjhar belt is located in backward areas where general living condition of the people is below poverty line. Agriculture has not been

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developed in the region to the extent it should have been. People, therefore, depend mostly on the mines for their livelihood. This has got a positive impact on the living condition of the local inhabitants. At least, these people have been assured of their daily bread.

Besides the direct employment in the mines, indirect engagement may be two to three times. Mining activity in the area has brought some positive effect like better employment potentiality, better health care, better living, better sanitation conditions, better education facilities etc.

vii) Historical Monuments etc.:

The area is devoid of any notable historical monuments.

AS PER MODIFICATION TO THE APPROVED MINING PLAN

i) Land area indicating the area likely to be degraded due to quarrying/pitting, dumping, roads, workshop processing plant, township etc.

An area of 16.464 hectares is already degraded due to mining and exploration. It was mentioned in the approved mining plan that during ensuing five years for mining and allied activities additional 11.835 hectares land will be utilized. But as stated earlier, mining operation in the said mine is suspended due to forest and environment clearance and three years of the approved plan period has already been passed, so, planning has been made for rest one year period. As such, actual land requirement for one year period has been calculated and given in Table below:

Sl. No.	Pattern of Utilization	Existing	Rest one year of the approved plan period	Total
a)	Mining	8.698	3.520	12.218
b)	Storing of minerals / ore	Nil	1.000	1.000
c)	Dumping of overburden	5.620	3.500	9.120
e)	Construction of building power station, work shop, etc.	0.607	Nil	0.607
f)	Township / housing colony	Nil	Nil	Nil
g)	Construction of Road, railway line, etc.	1.539	0.20	1.739
h)	Plantation	-	0.410	0.410
	Grand Total	16.464	8.630	25.094

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Rest item (ii) to (vii) - No Change. Same as mentioned in the approved mining plan

c) Attach an Environment Management Plan (supported by appropriate plans and sections) defining the time-bound action proposed to be taken with sequence & timing in the following areas (or diagrams should be used):

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Temporary storage and utilization of top soil :

No Change. Same as mentioned in the approved mining plan.

Year wise proposal for reclamation of land affected by abandoned quarries and other mining activities during first five years:

No Change. Same as mentioned in the approved mining plan.

Programme of afforestation year wise for the initial four years indicating numbers of plants with name of species to be afforested under different areas in hectares:

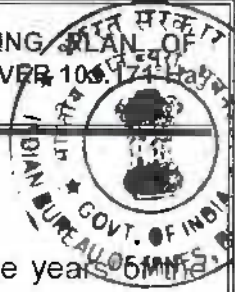
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As mentioned in land use pattern, the total area degraded due to the existing and proposed mining activities are restricted to 28.299 hectares. It has been proposed to have plantation all along the ML boundary.

The detailed year wise plantation is tabulated as follows :

Year	Area to be planted (m ²)	Spacing (m)	No. of saplings	Type of species to be planted	Location
2 nd year (2007-08)	6600	2.5	650	Accacia, Eucalyptus, Casuarina, etc	All along the ML boundary and around rest shelter & magazine.
3 rd year (2008-09)	3300	2.5	525		
4 th year (2009-10)	3300	2.5	525		
5 th year (2010-11)	3300	2.5	525		
Total	16500	2.5	2625		

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No mining operation was being carried out in the area during the first three years of the approved plan period. As such, no plantation work is being done during the first three years of the plan period. Now, as only one year is left, plantation programme is chalked out for the rest one year period which is given below:

Year wise proposed plantation for the rest one year of the approved plan period.

Year	Area to be planted (Ha)	Spacing (m)	No. of saplings	Type of species to be planted	Location
5 th year (2010-11)	0.41	3.0	250	Accacia, Eucalyptus, Casuarina, etc	Along the ML boundary

Stabilisation and vegetation of dump along with waste dump management year wise:

No Change. Same as mentioned in the approved mining plan.

Measures to control erosion/sedimentation of water courses:

No Change. Same as mentioned in the approved mining plan.

Treatment and disposal of water from mine:

No Change. Same as mentioned in the approved mining plan.

Measures for minimizing adverse effects on water regime:

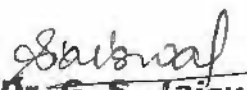
No Change. Same as mentioned in the approved mining plan.

Protective measures for ground vibrations/air blast caused by blasting:

No Change. Same as mentioned in the approved mining plan.

Measures for protecting historical monuments and for rehabilitation of human settlements likely to be disturbed due to mining activity:

No Change. Same as mentioned in the approved mining plan.


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Socio economic benefits arising out of mining:

No Change. Same as mentioned in the approved mining plan.

Schedules of monitoring the quality of air, water and noise level throughout the life of the mine may be outlined as follows :

AS PER APPROVED MINING PLAN

a) Parameters to be examined in water as per IS 2296 & 10500

It has been proposed to be examined in the water samples taken from nearby water sources such as Karo river and Dalpahar Village, dug wells and tube wells. Frequency of monitoring will be restricted to Summer, Monsoon, post Monsoon and Winter.

b) Parameters to be examined in air / dust fall as per IS : 5182

The parameters like RPM, SPM, SO₂, NO_x and CO are proposed to be quantified in the air samples taken from core zone as well as buffer zone.

The phase wise monitoring period will be confined to 8 hours per day, eight days per season (Two days per week for one month) and four seasons per year throughout the life of the mine:

c) Measurement of Noise Level :

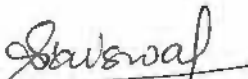
Measurement of the noise-level at different strategic locations at the mine sites and in core area including buffer zone locations.

d) Organizational chart for monitoring :

A team of workers having the knowledge in environmental monitoring work will be engaged to carry out the monitoring work in the area. The overall work will be managed by environmental engineer. Percentages of the noxious or hazardous gasses / materials will be detected by the chemists in the registered laboratories from the samples collected in the field.

AS PER MODIFICATION TO THE APPROVED MINING PLAN

No Change. Same as mentioned in the approved mining plan.


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PROGRESSIVE MINE CLOSURE PLAN OF

DALPAHAR IRON & MANGANESE ORE MINES

(KEONJHAR DISTRICT, ORISSA STATE)



MINING LEASE AREA	101.171 HECTARES
DATE OF EXPIRY	08.06.2006
CATEGORY OF LAND	FOREST LAND
CATEGORY OF MINE	GROUP -A (OTFM)
SUBMITTED UNDER RULE	10 OF MCDR, 1988.

for & on behalf of
Sri avin Jain
Legal heir to
Late DHARAMCHAND JAIN
Mining Lessee

PREPARED BY
Dr GURPINDER SINGH JAISWAL
CONSULTANT (MINES & MINERALS)
GOVERNMENT RECOGNISED
REGD.NO. RQP/CAL/151/90/A



1.0 INTRODUCTION

Name of the Lessee:

Avin Jain
Legal heir of Late D.C. Jain

Permanent Address

DHARAM VILLA
12-A, Mahatma Gandhi Marg (Ring Road)
Lajpat Nagar, IV, New Delhi – 110 024
Tel : 625003 / 3002 (O), 6437519 / 4921 (R)
Fax : 6259576, Cable - DHARAM
E-mail – avinjain@yahoo.com

Location and Extent of Lease Area:

Same, as mentioned in the approved mining plan.

Details of the land Covered on the area :

Same, as mentioned in the approved mining plan.

Type of Lease Area (forest, non-forest etc.):

Same, as mentioned in the approved mining plan.

Present Land Use Pattern:

Same, as mentioned in the approved mining plan.

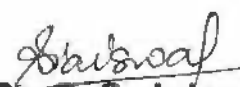
Method Of Mining:

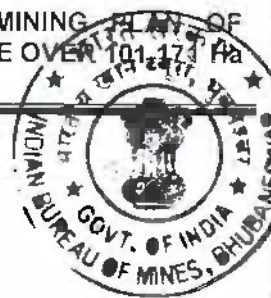
a) As per approved mining plan:

Method of mining will be opencast and semi-mechanized. Machines under deployment are drills, air compressors, dumpers, etc.

b) Proposal as per this modification to the approved mining plan:

Same as mentioned in the approved scheme of mining.


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Mineral Processing Operations:

a) As per approved scheme of mining

Ore raised from the mine will require, sizing, dressing sorting, screening & blending etc. prior to dispatch. Manual method will be adopted to achieve all this process.

b) Proposal as per this modification to the approved mining scheme:

Same as mentioned in the approved mining plan.

1.1 Reason For Closure:

As per approved mining plan:

- * Predictable - It is expected that during five years plan period iron ore will be available upto 20m from the surface level and consequently the life of the mine may further increase after detailed exploration. Therefore, we don't foresee any eventuality to close the mine.
- * Unpredictable - Closure may be possible due to natural calamities, mine related accident, local issue, etc.

Hence, closing the mine as a whole does not arise at present.

As per this modification to the approved mining plan:

No Change. Same as mentioned in the approved mining plan.

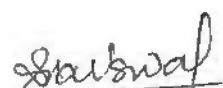
1.2 Statutory Obligation:

a) As per approved mining plan:

Progressive mine closure is required under rule 23 B(2) of MCDR, 1998 for working lease vide notification GSR 330 (E) dated 10.04.2003.

b) As per this modification to the approved mining plan:

No Change. Same as mentioned in the approved mining plan.


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1.3 Closure Plan Preparation :

a) As per approved mining plan:

Name and address of the applicant:

DHARAM VILLA
12-A, Mahatma Gandhi Marg (Ring Road)
Lajpat Nagar, IV, New Delhi – 110 024
Tel : 625003 / 3002 (O), 6437519 / 4921 (R)
Fax : 6259576, Cable - DHARAM
E-mail – avinjain@yahoo.com

**Name and address of the RQP who:
prepared the Mine Closure Plan.**

GEOMIN CONSULTANTS (P) LTD.
267, Kharavela Nagar
Bhubaneshwar – 751001
Phone : 2392080, Fax – 2390687
E-mail : geomin@satyam.net.in
Regd No. RQP/CAL/167/92-B.

Name of the Executing Agency :

Closure plan will be implemented by the RML applicant. Sri. Avin Jain, Legal heir of Late D.C. Jain.

b) As per this modification to the approved mining plan:

Name and address of the applicant: Same, no change.

**Name and address of the RQP who:
prepared the Mine Closure Plan.**

Dr Gulpinder Singh Jaiswal
B/4, Aastha Cottage,
Air Base Colony, Kadma – 831005,
JAMSHEDPUR.
Telefax : (0657) 2308439.
E-mail : gulpinder_mining@sify.com
Regd No. RQP/CAL/151/90/A.

Name of the Executing Agency : Same, no change.

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2.0 MINE DESCRIPTION:

2.1 Geology:

No Change.

2.2 Reserve:

The detail of estimation of Geological Reserve is given in Chapter – 3.0.

2.3 Mining Method:

No change. Same as mentioned in the approved mining plan.

Extent of mechanization & mining machinery:

Details given in the Mining Chapter.

2.4 Mineral Beneficiation:

a) As per approved mining plan:

Ore raised from the mine will require sizing, dressing, sorting / screening, blending etc prior to despatch. Manual method will be adopted to achieve all this process. The iron ore required to be sized by employing manual labours. Manual labourers will also be employed for segregating the gangue materials from the ore.

Beneficiation process will yield

i)	Size	-	10-15mm, 50-150mm
ii)	Grade (average)	-	>63% Fe
iii)	Recovery	-	98%

b) As per this modification to the approved mining plan:

No change. Same as mentioned in the approved mining plan.

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3.0 REVIEW OF IMPLEMENTATION OF MINING PLAN/SCHEME INCLUDING FIVE YEARS PROGRESSIVE CLOSURE PLAN UPTO THE FINAL CLOSURE OF MINE.

a) As per approved scheme of mining

Preparation of Progressive Mine Closure Plan (PMCP) came in to force vide the notification GSR 330 (E) dated 10.04.2003. Therefore, this is the first PMCP which is supposed to be reviewed after 2011-2012 onwards while preparing PMCP as a component of next five years (2011 – 2012 to 2015 – 2016) scheme of mining.

b) As per this modification to the approved mining plan:

Same as mentioned in the approved mining plan. No change.

4.0 CLOSURE PLAN:

Mined Out Land:

a) As per approved mining plan :

During Planned Period

A total of 15.833 hectares of land will be degraded during planned period of 5 years. During this period none of the quarry is going to be exhausted. Therefore, there is no proposal for reclamation & rehabilitation of mined out land. However, the year wise land use pattern is as follows :

Year	Pit No.	Mined out area at the beginning	Additional area proposed during the year	Total area	Area reclaimed & rehabilitated during the year	Mined out area at the end of the year
2 nd year (2007-08)	Iron & Manganese	8.698	2.350	11.078	Nil	11.078
3 rd year (2008-09)	Iron & Manganese	11.048	1.427	12.475	Nil	12.475
4 th year (2009-10)	Iron & Manganese	12.475	1.604	14.079	Nil	14.079
5 th year (2010-11)	Iron & Manganese	14.079	1.754	15.833	Nil	15.833
Total			7.135			

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Conceptual Period

A total of 65.833 hectares of land will be degraded during conceptual period for mining. Details of the location, area & types of reclamation / rehabilitation measures have been given below :

Name of the quarry	Period of Reclamation & Rehabilitation Measures	Location	Area (hects)	Type of Reclamation & Rehabilitation Measures
Manganese & Iron	During Conceptual period	Total mined out area (Ref. Plate - VIII)	65.833	Back filling & Plantation

b) As per this modification to the approved mining plan:

A total of 12.218 hectares of land will be degraded during planned period. During this period none of the quarry is going to be exhausted. Therefore, there is no proposal for reclamation & rehabilitation of mined out land. However, the year wise land use pattern is as follows :

Year	Pit No.	Mined out area at the beginning	Additional area proposed during the year	Total area	Area reclaimed & rehabilitated during the year	Mined out area at the end of the year
2 nd year (2007-08)	Iron & Manganese	8.698	Nil	8.698	Nil	8.698
3 rd year (2008-09)	Iron & Manganese	8.698	Nil	8.698	Nil	8.698
4 th year (2009-10)	Iron & Manganese	8.698	Nil	8.698	Nil	8.698
5 th year (2010-11)	Iron & Manganese	8.698	3.52	12.218	Nil	12.218
Total			3.52			

Conceptual Period

Ultimate pit limit has been established considering the proved and probable reserve zone. As such, at ultimate stage, about 8.13 ha area shall be degrade due to excavation in iron ore zone whereas about 20.46 ha area shall come under excavation at ultimate stage in

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manganese ore zone. So, total 28.59 ha mined out area will be degraded due to excavation by pits at ultimate stage.



Exploration Proposed

a) As per approved mining plan :

During planned period

During planned period of 5 years, an area of 2.00 hectares of land will be utilized for ore zone exploration purposes.

During Conceptual period

Beyond the planned period of 5 years, an area of 10.00 hectares of land will be utilized for ore zone exploration purposes.

b) As per this modification to the approved mining plan:

During planned period

The exploration programme for the plan period has been modified as only last year is in hand. The detail of exploration for the plan period is given in Chapter – 3.0.

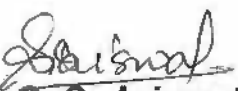
During Conceptual period

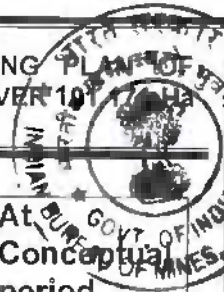
Further, 68 number of Boreholes have been proposed during the conceptual period is shown in Geological plan, marked as LBH.

Other than quarry area

a) As per approved mining plan :

Conceptually, a total area of 16.666 hectares under dumping, sub-grade stacking, infrastructure & road will be reclaimed & rehabilitated by means of plantation at the end of the conceptual period. The details of the land use pattern is as follows :


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Sl. No.	Pattern of Utilization	Existing	Planned 5 years	Beyond 5 years	At Conceptual period
A	Mining	8.698	7.135	50.000	65.833
B	Dumping of overburden	5.620	3.500	4.000	13.120
C	Sub-grade storage	Nil	1.00	Nil	1.000
D	Construction of building power station, work shop, etc.	0.607	Nil	Nil	0.607
E	Township / housing colony	Nil	Nil	Nil	Nil
F	Construction of Road	1.539	0.20	0.200	1.939
G	Railway line etc, Magazine	Nil	Nil	Nil	Nil
H	Green Belt	Nil	1.650	2.250	3.900
	Grand Total	16.464	13.485	56.450	86.399

b) Proposal as per this modification to the approved mining plan:

At conceptual stage, a total area of 16.666 hectares under waste dumping, sub-grade stacking, infrastructure & road. On the other hand about 3.900 ha area shall come under rehabilitation by means of developing green belt at the end of the conceptual period. The details of the existing land use, land to be degraded at the end of plan period and at conceptual period is given in Table below:

Table showing existing land use, land to be degraded at the end of plan period and at ultimate stage.

Sl. No.	Pattern of Utilization	Existing	At the end of plan period	At ultimate stage
A	Mining	8.698	12.218	28.590 – (10.63 ha area will be backfilled and planted. Rest 17.96 ha will be rehabilitated by plantation).
B	Dumping of overburden	5.620	9.120	13.120 – (Total waste material shall be utilized for backfilling and the area shall be rehabilitated by plantation)
C	Sub-grade storage	Nil	1.00	1.000 – (The area shall be rehabilitated by

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				plantation).
D	Construction of building power station, work shop, etc.	0.607	0.607	0.607- (shall be handed over to forest authority or dismantled and planted).
E	Township / housing colony	Nil	Nil	Nil
F	Construction of Road	1.539	1.739	1.939 (shall be utilized by the forest authority).
G	Railway line etc, Magazine	Nil	Nil	Nil
H	Green Belt	Nil	0.410	3.900 (Development of green belt).
	Grand Total	16.464	25.094	49.156

4.2 Water Quality Management:

a) As per approved mining plan

Existing Surface Water Bodies -

There is no perennial nala within the lease area. Seasonal nalas carry the rain and run-off water into Karo Nadi, which is the main perennial surface water source in the region.

Existing Ground Water Bodies -

Tube well put by the Lessee, is the ground water source for drinking, cooking, etc.

Water Quality Management-

Working benches will be kept free from loose overburden / waste materials. Check dam will be constructed around the dump to prevent washing off of loose sediments. All the drainage system used for surface flow water will be cleared off and will be utilized for the natural flow of rain water from the very beginning of the 1st year working.

Year	Location	Check dam			Garland drain			Settling tank		
		T(m)	B(m)	D(m)	T(m)	B(m)	D(m)	T(m)	B(m)	D(m)
2 nd year (07-08)	Around the dump 1 & 2	300	2	1	250	2	1	3	2	1
3 rd year (08-09)		200	2	1	150	2	1	3	2	1
4 th year (09-10)		Maintenance			Maintenance			Maintenance		
5 th year (10-11)		Maintenance			Maintenance			Maintenance		
Total		500	2	1	400	2	1	3	2	1

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Method of rain water management :

Drainage system of the area is controlled by the Kundru nalla which flows in the western side of the area at a distance of 1 km from the lease area. Three to four seasonal nalla passes in the lease area along south to north boundary to meet main nalla. The manner of disposal of drain water from the quarry & dump area has been depreciated in the environment management plan through garland drain via settling tanks.

b) Proposal as per this modification to the approved mining plan:

Same as mentioned in the approved mining plan. Only, management of the water by constructing check dam, garland drain and settling pond has been planned a fresh as this modification is only for a period of one year and is given below:

Year	Location	Check dam			Garland drain			Settling tank		
		L(m)	B(m)	D(m)	L(m)	B(m)	D(m)	L(m)	B(m)	D(m)
5 th year (10-11)	Around the dump 1 & 2	300	2	1	250	2	1	3	2	1

4.3 Air Quality Management:

a) As per approved mining plan

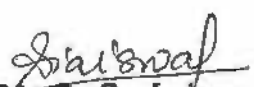
Existing Air Quality Status -

There opencast mines mainly emit dust particles. However, air pollution is felt to be below the permissible limit.

Corrective Measures

Monitoring

Seasonal ambient air & noise monitoring has been undertaken during 2005. It has been found that the amount of pollutants is below the permissible limit described by ministry of environment & forest. Noxious gases such as Sox, Nox & CO have been quantified. Dust fall, SPM & RPM have been measure. Due to continuation of mining operation pollution level will be increased. Therefore, monitoring of air & noise is proposed to be continued quarterly.


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Management

An area of 1.65 hectares is proposed to be planted with 2625 saplings. Water sprinkling will be done over the dust prone areas such as haul road, working faces, loading & unloading points, etc. Conceptually, there will be plantation of 3600 saplings over an area of 2.250 hectares.

b) Proposal as per this modification to the approved mining plan:

Same as mentioned in the approved mining plan. However, plantation programme has been chalked out only for one year by planting 525 saplings covering about 0.410 ha area.

4.4 Waste Management:

a) As per approved mining plan

The waste generated from proposed iron quarry will be dumped on western side of shale patch & the waste generated from proposed manganese quarries will be dumped on western side of Block – B. To confirm the barrenness of the proposed dumping area DBH holes were proposed.

Maximum Height and Spread of Dumps :

Proposed Dump -1 (Manganese)

Waste materials likely to be generated	=	300750 m ³
Average height of the dump proposed	=	15m
Surfacial area required	=	20000 m ²

Proposed Dump -2(Iron)

Waste materials likely to be generated	=	228960 m ³
Average height of the dump proposed	=	15.26m
Surfacial area required	=	15000 m ²

Year wise land use pattern is as follows

Year	Dump No.	Nature of dump i.e. OB rejects, etc.	Area at the beginning of the year	Additional area during the year	Area rehabilitated during the year	Total at the end of the year
2 nd year (2007-08)	Proposed dump for Iron & Manganese	Laterite	5.620	1.550	Nil	7.170

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3 rd year (2008-09)	Proposed dump for Iron & Manganese	Laterite	7.170	0.700	0.26	
4 th year (2009-10)	Proposed dump for Iron & Manganese	Laterite	7.850	0.650	0.20	
5 th year (2010-11)	Proposed dump for Iron & Manganese	Laterite	8.50	0.600	0.30	8.80

An area of 0.70 hectare in rehabilitated through plantations on the dump slopes from third year onwards. Conceptually, there will be generation of 317640 m³ and 3756155 m³ of waste from iron and manganese ore zone respectively.

Out of the waste from the proposed iron and manganese ore zone 50% will be disposed in the mined out area and 30% will be used for road maintenance. Remaining 20% of waste will be disposed in the dump covering an area of 40000 m².

The following measures were suggested to stabilize the dump and for the arrest of wash-offs.

- 1) Segregation of materials
- 2) Water Sprinkling
- 3) Regular compaction
- 4) Terracing at the dead end
- 5) Construction of check dam
- 6) Development of garland drain
- 7) Settling tank

The conceptual area for dumping will be reclaimed & rehabilitated by means of plantation. The ultimate dump slope at the conceptual slope will be maintained at 20 – 22° with individual slopes not exceeding 37°. The individual terrace height will be limited to 10m. Each terrace has provision catch drains at the inward side of the terrace. The catch drains at the individual terrace will be connected to garland drains will be preferable half concrete open pipes followed by settling tanks to avoid wash offs.

b) Proposal as per this modification to the approved mining plan:

The nature of waste is same as mentioned in the approved mining plan. Hence, based on the excavation, quantity of intercalated waste, sub-grade to be generated during the rest one year of the approved plan period has been estimated and given in Chapter – 7. The

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(Dump – 2) as indicated in plate -8 & the waste from proposed manganese quarries will be dumped on western side of Block – B (Dump-1). The dumps (PD – 1 & PD – 2) is sufficient to accommodate the waste to be generated during the year 2010-11. The stored height of the proposed dump is as follows:

Waste dump:

Proposed Dump -1 (Manganese)

Waste materials likely to be generated	=	76935.62 m ³ (Loose)
Average height of the dump proposed	=	3.85 m
Surfacial area required	=	20000 m ²

Proposed Dump -2(iron)

Waste materials likely to be generated	=	57375 m ³ (Loose)
Average height of the dump proposed	=	3.83 m
Surfacial area required	=	15000 m ²

The protective measures and reclamation & rehabilitation process will be same as mentioned in the approved mining plan.

4.5 Top-Soil Management:

a) As per approved mining plan

Since the proposed mining area is covered with lateritic capping, the question of top soil generation or stacking there of does not arise.

b) Proposal as per this modification to the approved mining plan:

No Change. Same as mentioned in the approved mining plan.

4.6 Tailing Dam Management:

Not applicable



4.7 Infrastructure:

a) As per approved mining plan

Applied M.L area is approachable from Joba covering a distance of 85 kms. The nearest railway station is at Barbil. Paradeep port is the nearest port situated at a distance of 330kms. Eight meters wide haul roads have been well developed in the lease area at 1:20 gradient. Drinking water is available from the tube well located near campsite.

* Proposed

Administrative office, rest shelter, blasting shed etc are already in existence for smooth running of the day to day mine operation.

b) Proposal as per this modification to the approved mining plan:

Same, no change. However, it is proposed to provide statutory and essential infrastructure like office, rest shed, blasting shed, first-aid center, crèche canteen and drinking water facilities in the lease area. At the time of final closure, this infrastructure shall be handed over to forest authority after negotiation. In case of failure of negotiation, which has very remote chance, the infrastructure shall be dismantled and the area shall be rehabilitated by plantation.

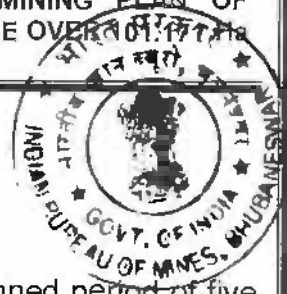
4.8 Disposal of Mining Machinery:

a) As per approved mining plan

There is no possibility of decommissioning of mining machinery during the planned period of five (5) years.

b) Proposal as per this modification to the approved mining plan:

Same, no change. But in distance future, if there is any closure of the mines, all the machines shall be shifted to some other sister company/ disposed off (as the case may be).



4.9 Safety and Security:

a) As per approved mining plan

There is no possibility of abandonment of quarries dumps etc during planned period of five (5) years. However, during mining the following measures has been proposed for safety and security. Mine working will be fenced off to prevent falling down of man and animals. A guard will be employed to prevent pilferage or theft and to keep the explosives in safe & secure. Blasting danger zone will be identified and indicated to the concerned mine people and nearby locality to avoid inadvertent trespassing. Whistle or siren will be blown at the time of blasting to aware the man & animals for entering in to the blasting danger Zone.

During Abandonment

During the schemed period of 5 years, there will be no exhaust of iron ore in the quarries or part thereof. Therefore, the question regarding mine abandonment does not arise.

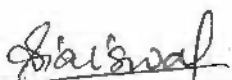
b) Proposal as per this modification to the approved mining plan:

Same, no change. At the time of final closure of the mines, all the abandoned pits shall be reclaimed and rehabilitated as far as possible to get back the original landform. As a result, all the excavated area will be safe & secured from any danger. All the roads will be closed to stop unauthorized entry in abandoned mining sites. It is also proposed to put signboards in all the closed pits. Till such time, the area is handed over to the forest authority; guards shall be engaged for security and safety.

4.10 Disaster Management and Risk Assessment:

a) As per approved mining plan

- Landslide, subsidence and inundation is not expected due to opencast mining.
- Though earth quake is felt several times in Orissa, damage to man & materials has not been severe.
- Keeping in view the past occasion, folding is not expected as the area is located in higher levels, Karo, river controls the drainage system and receives the entire rain & run-off water.


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- Small scale fire may be possible which can be extinguished by fire extinguisher.
- Area under reference will have a small mine having the production target of 50,000 MT/ annum of iron ore and 3000 MT/annum of manganese. After breaking, sorting and blending, ore will be marketed without leaving fines and generating slimes. Therefore, tailing dam is not necessarily required and the question regarding the tailing dam failure does not arise

b) Proposal as per this modification to the approved mining plan:

Same, no change.

4.11 Care and maintenance during temporary discontinuous:

a) As per approved mining plan.

Temporary discontinuance may happen due to various causes such as:

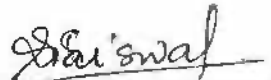
- Court order
- Natural calamities
- Accident (mine related)
- Slope failure
- Failure in fulfillment of statutory requirement
- Local issues or
- Any other unforeseen circumstances

If there will be temporary discontinuance, the following measures can be undertaken depending upon the causes:

- Intimation to local mine & legal administrative authorities regarding the discontinuance.
- Listing of the machines & materials
- Care and maintenance of machinery as per the machine operating manuals.
- Tightening of the security to keep the machine and materials safe & secured.
- Preparation of plan & sections at the time of discontinuance.
- Repair & maintenance of haul road.
- Regular monitoring of air, water, noise etc in the permitted area.

b) Proposal as per this modification to the approved mining plan:

Same, no change.


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5.0 ECONOMIC REPERCUSSIONS OF CLOSURE OF MINE AND MINOR RETRECHMENTS:

a) As per approved mining plan

5.1 Number of local residents employed in the mine, status of continuation of family occupation.

Not applicable

5.2 Compensation given or to be given to the employs connecting with sustenance of himself and their family member.

Not applicable

5.3 Satellite occupation connected to mining industry number of persons engaged there in, continuance of such business after mine closes.

Not applicable

5.4 Continued engagement of employees in the rehabilitated status of mining lease area and any other remnant activities.

Not applicable

5.5 Envisaged Repercussions on the Expectation of the Society around due to closure of Mine.

Not applicable

b) Proposal as per this modification to the approved mining plan:

Same, no change.

6.0 TIME SCHEDULING FOR ABANDONMENT:

Proposal as per this modification to the approved mining plan:

In the approved mining plan, year-wise activities like stabilization and rehabilitation of dumps, afforestation along green belt etc was proposed and mentioned that at least three years will be required tentatively for the purpose of decommissioning & reclamation & rehabilitation to be done after cessation of mining & mineral processing operation.

Now, only one and last year of the approved mining plan is in hand, as such, proposal has been given for only one year i.e. for the year 2010-11 in a tabular form as below:

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5th year (2010-11) Proposal for Item no. 6 & 7 of PMCP.

ITEMS	DETAILS	AREA (HECT)	QUANTITY	EXPENDITURE (Rs.)	REMARKS
		PROPOSED	PROPOSED	PROPOSED	
(A) RECLAMATION & REHABILITATION OF MINED OUT LAND/AREA	i) Backfilling	There is no possibility of abandonment of quarries or part thereof during this plan period.			
	ii) Afforestation of the backfilled area				
	iii) Others (please specify)				
	iv) Pisciculture				
	v) Converting into water reservoir.				
	vi) Picnic Spot				
(B) STABILIZATION & REHABILITATION OF DUMPS (within lease)	i) Terracing	—		2000	
	ii) Pitching				
	iii) Construction of Parapet Walls/Retaining wall at the toe of dumps	0.06		8000	
	iv) Construction of Check Dams along slope of valleys etc.	0.06		8000	Detail given in Chapter - 7
	v) Construction of Settling ponds (Garland Drain etc.)	0.01		3000	Detail given in Chapter - 7
	vi) Desilting of settling ponds, channels.	Nil			
	vii) Afforestation on dumps	0.03		150	
	viii) Others (Please Specify)				
(C) REHABILITATION OF BARREND AREA WITHIN LEASE	i) Afforestation (Green Belt building)	0.33	3300	1650	Ref. Plate – EMP.
	ii) Others (Please Specify)				
(D) ENVIRONMENTAL MONITORING (Core zone & Buffer Zone separately)	i) Ambient Air Quality			150000	
	ii) Water Quality			30000	
	iii) Noise Level Survey			20000	
	iv) Ground Vibration			30000	
	v) Others (Please Specify)			20000	
	TOTAL			272800	

7.0 ABANDONMENT COST:

a) As per approved mining plan

1) Decommissioning / Demolition:

Not applicable

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2) Removal of infrastructure :

Not applicable

3) Removal of equipment and heavy machineries :

The mining lease area will neither have any foundation work for crushing & beneficiation plant etc nor the deployment of any heavy machinery. Therefore, there will be no additional expenditure in respect of the above.

4) Site Safety

Not applicable

5) Remediation / Mitigation measures:

An area of 131200 m² is proposed for conceptual dumping. Total cost required for construction check-dam, garland drain and reclamation and rehabilitation of dumps through plantation are calculated as follows:

i. Construction of check – dam :

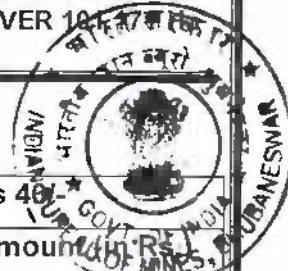
Taking an average length of 400m, total amount required will be Rs. 12000/- @ Rs. 30/- per meter. Size of the check dam will be 400m (length) x 2m (width) x 1.5m (height)

ii. Providing garland drain :

Taking an average length of 400m, total amount required will be Rs. 6,000/- @ Rs. 15/- per meter. Dimension of the garland will be of 330m (length) x 1m (width) x 1m (Depth)

iii. Total amount required under item no i & ii comes to be Rs. 12,000 + Rs 6,000/- = Rs. 18,000/-

iv. Standard cost norm for enrichment of plantation per hectare is as under :



a) **PRE-PLANTING & NURSERY**

Sl No.	800 plants / hectare	Wage rate Rs 40/-	
	Item of work	Mandays required	Amount (in Rs.)
1	Site preparation	5	200.00
2	Alignment & Stacking	4	200.00
3	Cost of stacking materials	Lump sum	200.00
4	Nursery cost of 400 seedlings @ Rs. 3.00	—	1200.00
5	Pitting	10	400.00
Sub Total :			2200.00

b) **CREATION AND MAINTENANCE**

1.	Carriage & planting	10	400.00
2.	Weeding, soil working and manuring (thrice)	18	720.00
3.	Application insecticides (thrice)	3	120.00
4.	Fire line tracing inspection path	4	160.00
5.	Cost of fertilizers & insecticides	Lump sum	500.00
6.	Watch & ward	30	1200.00
Sub - Total :-			3,100.00
Grand total :-			5,300.00

(6) **Reclamation and rehabilitation of workings**

- i) Waste available during planned period (refer Para 7.4.1 of mining = 5,29,710 m³
- ii) Waste available during conceptual period (refer Para 4.5.4 of mining plan) = 24,44,277 m³ (60% of total waste of 4073795 m³)
- iii) Total waste required to be rehandled / backfilled = 529710+2444277 = 29,73,987 m³
- iv) Cost required for rehandling/ back filling @ Rs 12 per m³ = 29,73,987 x Rs. 12 = Rs. 35,687,844/-
- v) Cost required for leveling and compaction of 65.833 hectare mined out area @ Rs. 1000/- hectare = 65.833 x Rs. 1000 = Rs. 65,833/-
- vi) Cost required for rehabilitation by way of vegetation in back filled area over 65.833 hectare @ Rs. 5300/- [Ref. Previous Para 7(5) (iv)] = 65.833 x Rs 5300/- = Rs 3,48,915/-
- vii) Cost required for vegetation of remaining degraded area of 87.399-65.833 =21.566 hectares = 21.566xRs. 5300/- Rs. 114299.80 say 1,14,300/-
- viii) Total amount required for reclamation and rehabilitation = Rs 35687844/-+Rs 65833/-+Rs 348915/- +Rs. 114300/- = Rs. 36216892

(Dr. G. S. Jaiswal)
(Dr. G. S. Jaiswal)



(7) Maintenance/ monitoring during and after closure operation :

Not applicable

(8) Retrenchment and relocation cost :

Not applicable

(9) Research and development :

Not applicable

(10) Administrative / management :

- i. Fees to be paid for preparation of closure plan procurement of information and data from various institution/ organization is Rs 50,000/
- ii. Salary and wages of supervisory and managerial personnel for maintenance and monitoring activities for 2 years Rs. 72,000/- @ Rs. 3000/- month.
- iii. Total amount requirement under administrative expenditures is Rs. 50,000/- + Rs. 72,000/- = Rs. 1,22,000/-

Therefore, the funds required for abandonment is [Ref. 7(5), (6) & (10)] = Rs. 18,000/- + Rs. 36216892/- + Rs 1,22,000/- = Rs. 36356892 /- or say 363.56 lakh rupees

b) Proposal as per this modification to the approved mining plan:

In the approved mining plan, the abandonment cost was calculated based on the five year plan basis. As the four years of the approved mining plan have been passed, the abandonment cost is calculated which comes to Rs. 2,72,800 .00. (Ref Table above).

8.0 FINANCIAL ASSURANCE:

a) As per approved mining plan

Area under Financial Assurance is 29.949 ha

The deposit will be worked as A – Category semi- mechanized mine. Therefore, financial assurance is Rs. 748725/-, at the rate of Rs 25,000/- hectare.

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Present and Future land use pattern

Sl. No	Type of land use	Area of land use in (in ha)		
		As at present	As at the end of planned period of 5 years	As at the end of conceptual period (life of the mine)
1	Area to be excavated	8.698	15.833*	65.833
2	Storage for top soil	Nil	Nil	Nil
3	Overburden dump	5.620	9.12	13.12*
4	Mineral storage	Nil	1.00	1.00*
5	Infrastructure (workshop, administrative building etc)	0.607	0.607	0.607*
6	Roads	1.539	1.739	1.939*
7	Railways	Nil	Nil	Nil
8	Green belt	Nil	1.65	3.90*
9	Tailing pond	Nil	Nil	Nil
10	Effluent treatment plant	Nil	Nil	Nil
11	Mineral separation plant	Nil	Nil	Nil
12	Township area	Nil	Nil	Nil
13	Others (Magazine)	Nil	Nil	Nil
14	Area which will remains untouched	84.807	71.322	14.872
Total :		101.271	101.271	101.271

Note :- After plan till today no mining operation done due to forest clearance.

b) Proposal as per this modification to the approved mining plan:

It is clear from the land use pattern that out of 101.171 ha of mining lease area, 16.464 ha area has already been broken prior 1980. It is also clear from the table that further 8.63 ha of additional land will be required during this plan period. So, the total land in use by the end of this plan period will be 25.094 ha.

As the mining operation in the area is being carried out by open cast OTFM mining method and comes under the category of Group-A "other than fully mechanized mines". Thus as per guideline, the calculation for financial assurance has been done on the basis of Rs. 25000/- per hectare.

Financial Assurance : 25.094 x Rs. 25000
= Rs. 6,27,350/- only.

However

Financial assurance is for Rs. 7,48,725/- was already been submitted to IBM, Bhubaneswar vide Bank Guarantee no. 10590000707 dated 19.12.07 at the time of approval of mining

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The area already disturbed due to different activities, to be used during the scheme period, area reclaimed & rehabilitated and area considered for financial assurance have been given in a tabular form as below.

Break up of the land in use during this plan period
(Up to 31.03.2011)

(Area in Hectares)

Sl. No.	Head	Area put on use at the start of plan (Existing land use)	Additional requirement during Plan period.	Total	Area considered as fully reclaimed & rehabilitated	Net area considered for calculation
a	b	c	d	e e= (c+d)	f	g g = (e -f)
1.	Area to be excavated.	8.698	3.520	12.218	Nil	12.218
2.	Storage for top soil.	Nil	Nil	Nil	Nil	Nil
3.	Overburden dump.	5.620	3.500	9.120	Nil	9.120
4.	Sub grade Stacking	Nil	1.00	1.00	Nil	1.00
5.	Infrastructure (Workshop, administrative building).	0.607	Nil	0.607	Nil	0.607
6.	Roads.	1.539	0.20	1.739	Nil	1.739
7.	Railways	Nil	Nil	Nil	Nil	Nil
8.	Green Belt	Nil	0.410	0.410	Nil	0.410
9.	Tailing Pond	Nil	Nil	Nil	Nil	Nil
10.	Effluent Treatment Plant	Nil	Nil	Nil	Nil	Nil
11.	Screening plant	Nil	Nil	Nil	Nil	Nil
12.	Township area	Nil	Nil	Nil	Nil	Nil
13.	Others to specify. Magazine.	Nil	Nil	Nil	Nil	Nil
Total		16.464	8.630	25.094		25.094

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9.0 CERTIFICATES / ANNEXURES:

A certificate duly signed by the Lessee is attached to consider the closure plan and approach the concerned authorities wherever necessary.

10.0 PLANS, SECTIONS ETC.

A financial assurance plan is enclosed as Plate – 12.

अनुमोदित
APPROVED

[Signature]
11/10/2010

क्षेत्रीय खान निबन्धक
REGIONAL CONTROLLER OF MINES
भारतीय खान ब्यूरो
INDIAN BUREAU OF MINES
भुवनेश्वर/BHUBANESWAR

[Signature]
(Dr. G. S. Jaiswal)
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